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FEBRUARY 1986

VOLUME 4  
NUMBER 2

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# EDITOR'S NOTE

## MAKING THE IMPOSSIBLE POSSIBLE

Nick Sullivan, senior editor of FAMILY COMPUTING and a full-time employee, works in our New York office just about one week out of two. The rest of the time, Nick works from an at-home office in a barn in Massachusetts.

Joey Latimer, associate technical editor of FAMILY COMPUTING and a full-time employee, works in our New York office just about one week a year. The rest of the time, Joey works from a small office or from home, both of which are in Southern California.

Before the advent of computers, it would have been just about impossible for either Nick or Joey to work in such an unorthodox way and still meet the high-pressure deadlines of a monthly magazine. Even with computers, both these work styles are considered extreme.

But I could list the ways several other staff members work, and you'd see still more idiosyncracies. Reviews editor David Hallerman, for example, decides when in his work cycle it seems most productive to spend a morning or two—or even full days—on his computer at home. Without the interruptions of the phone or his colleagues, David is able to shave hours off the editing of a month's reviews. Without a computer at home, that would be impossible.

And most of my editor's notes are written at home and printed out at the office. Meetings, reading copy, phone calls, and questions leave little in the way of a block of time, which is needed to write. My computers at home make it possible.


If you can't tell us about how you're being more productive or efficient on your job, thanks to your own personal computer, this may be just the issue you've been waiting for. In this month's cover story, "HomeWork for Professionals" (page

23), contributing editor Chuck Gajeway outlines how just about any professional can benefit from using a computer at home. In addition to some basic guidelines and case studies, Gajeway presents a job analysis chart we can all use to help figure out if and how that computer at home can help us.

Once Gajeway gets you interested, you won't want to miss Abigail Reifsnnyder's "Buyer's Guide to Graphics Software for Every Palette." Reifsnnyder shows you how to use business, drawing, animation, and "printing-press" graphics programs. Charts of software available for each use accompany the text. And be sure to review Reifsnnyder's blue-ribbon choices in each category. You'll find that you can create professional quality presentations at home—an impossibility without your computer.

If you're already using your computer exclusively for work, now might be the time for you to branch out. Games reviewer Jamie Delson presents "Games for Beginners" in this month's Games column (page 18), and Joey Latimer has concocted an addictive arcade game, *Space Debris*, for C 64 and 128 owners. (Let me warn you, it had me playing—at the office—until 11:30 one night.)

We're sure that many of you are already putting your computers to use in a wide range of productive, inventive, and entertaining ways. Tell us about them and your family could win one of the fabulous prizes in FAMILY COMPUTING's "Second Annual Computing Family of the Year Contest." Details are on page 21. Don't forget to enter—we're rooting for you!



CLAUDIA COHL  
EDITOR-IN-CHIEF

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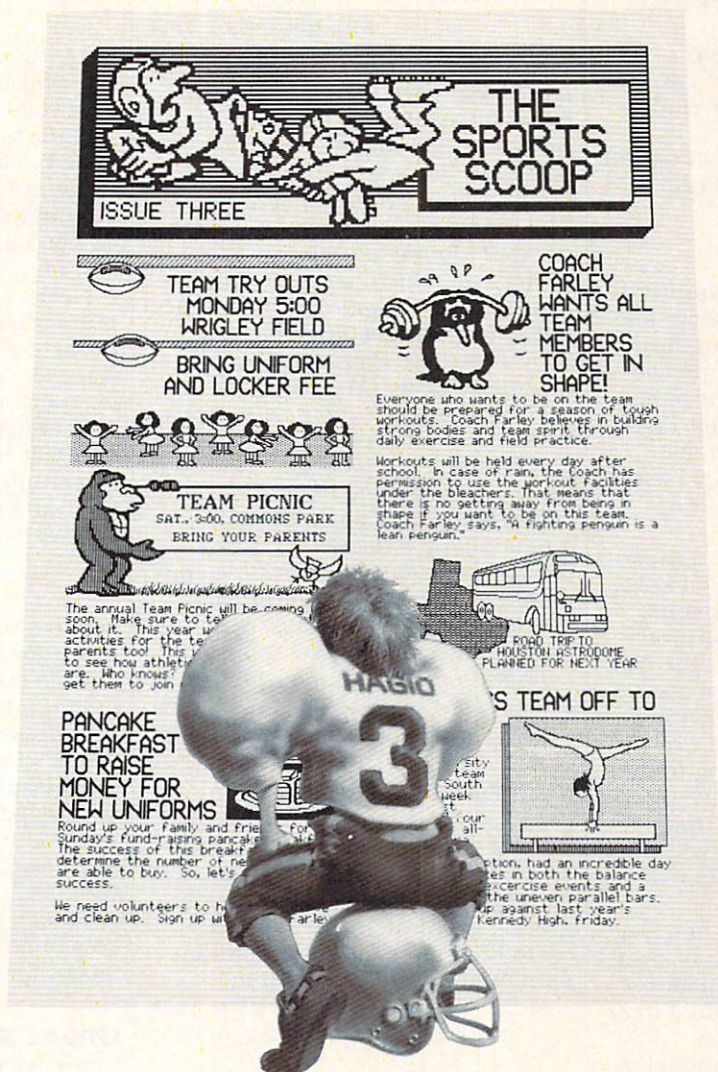
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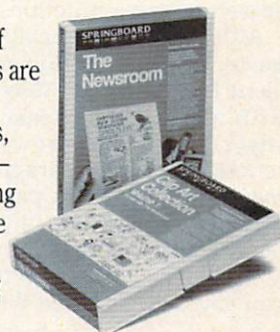
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# LETTERS

## SO EASY WITH THE AMIGA

I wanted to let you know that your program *Word Wars* (November 1985) will run on the Amiga. I made a couple of changes from your version for the Commodore 64/128. I'm not a programmer, but the Amiga points to where and what the error is, and makes it easy to step through a program. I was very pleased to have the program run correctly with my changes. The Amiga is super!

E.G. ALEXANDER  
Pomona, California

## A WORD ON WORD PROCESSING

Your recent "A Sampler of Word-Processing Programs for the Novice and the Pro" (November 1985) prompted me to write this letter. As a person who depends heavily on your publication to get information that I can understand and utilize with my computer (a Commodore 64), I felt compelled to write about your assessment of *Creative Writer*.

*Creative Writer* does have search/replace and it is quite simple to use. The program also has chain print (document link). Not only can you link documents from within the file directory, but you can merge documents from *Creative Writer* with files from *Creative Calc* and *Creative Filer*. In fact, according to the manual, you can even retrieve individual fields of information from *Creative Filer* to be integrated into form letters stored in *Creative Writer*.

*Creative Writer* does not, however, have the ability to underline or print in boldface or emphasized modes. I have searched the little manual from cover to cover and have gone through every help screen offered in search of these functions.

Although it is not called "cut-and-paste," *Creative Writer* has an equivalent feature (called "block-editing") with which you can easily move; copy; delete; or insert words, sentences, lines, and paragraphs. I have moved as much as a page and a half. Your report says that this program lacks a cut-and-paste function.

Under the category "File Limit," you say that *Creative Writer* has a 1.5 limit. That, too, is incorrect, since I have files containing several pages each.

Hoping one day to start a little word-processing business at home, I have read all FAMILY COMPUTING's related articles with avid interest. I have

always relied upon your magazine to give me accurate and useful information and have been able to sift through the maze of manufacturer propaganda by reading your great software reviews. Hence my surprise on reading this one.

PATRICIA HAYWARD  
Flushing, New York

EDITOR'S NOTE: *Thank you for setting us straight about the features and capabilities of Creative Writer. A version of the program that was released in the fall of 1985 does have boldface and underline features. The company is coming out with another improved update, Creative Writer 1.0, which you can obtain free by sending your old disk to Activision, Customer Service Dept., 2350 Bayshore Frontage Road, Mountain View, CA 94039.*

*There are a few more corrections to the "Sampler" on Roger Wagner Publishing Inc.'s program, The Write Choice, and Mirage Concepts' Word Processor Professional. These programs do have document, word, line, and paragraph editing, equivalent to a general cut-and-paste function. The Write Choice also has horizontal scrolling and split-screen capabilities. In addition, the "Ease of Use" category should have had a rating of Average for these programs.*

## OF INTEREST TO ALL

I enjoyed the maintenance tips in October 1985. I have a TI-99/4A computer, and only information pertaining to it or all computers in general is of interest to me. Please try to keep more of this general information in your publication.

THOMAS M. SWAN  
Natick, Massachusetts

## FROM AND ABOUT IBM

We were surprised that your recent "Buyer's Guide to General-Purpose Computers, (November, 1985) failed to include the IBM PCjr.

Contrary to some reports, IBM has not discontinued the PCjr. We are actively marketing and supporting the IBM PCjr. We consider it our most suitable system for home or education use because of its flexibility, affordable price, size, ease of use, and graphics and sound capabilities. The PCjr also can use most of the best-selling programs for the IBM Personal Computer. And as you pointed out elsewhere in your publication, the PCjr software pool is still increasing.

We hope you'll inform your readers of IBM's continued commitment to the PCjr, and we appreciate your including it in future articles.

JAMES C. REILLY  
Vice President,  
Communications and  
Marketing Services, IBM

Recently we purchased an IBM PC XT. Shortly afterwards, we discovered your magazine. Your magazine was the best thing that ever happened to our family. We love the little games and programs in the Programming section. Our 4-year-old has become an old pro at the *Draw & Print* program (September, 1985).

I work at a university with a computer science department. I have brought some of the programs to work for the students, and they enjoy them immensely.

I have been looking for a program that will create an eternal calendar; something for which I can input the year, and instantly have a calendar for that year. Do you know of any?

MARGO RHINEHART  
New Orleans, Louisiana

EDITOR'S NOTE: *We are pleased you are enjoying your PC XT and are finding FAMILY COMPUTING so useful. A program called Perpetual Calendar, that accomplishes the task you describe, appeared in our January 1985 issue and included a version for the IBM. To order back copies, send \$3.95 to FAMILY COMPUTING, Back Issues, P.O. Box 717, New York, NY 10276-0717. Make checks or money orders payable to FAMILY COMPUTING and allow six to eight weeks for delivery.*

## GREAT ARTICLES

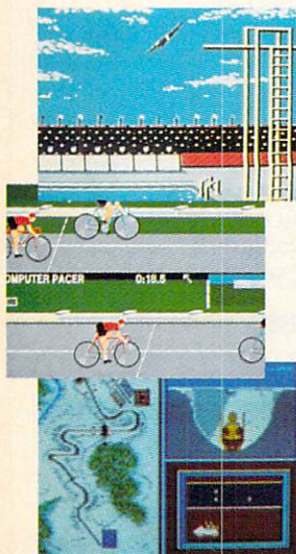
I have been receiving your magazine for about a year now and I think it's great! Your articles are clear and concise. They go right to the point and provide good information. I also enjoy your programs. I have owned a Commodore 64 for about 2 years. Keep those great articles going!

BRIAN O'SHENSKA  
Severn, Maryland

FAMILY COMPUTING looks forward to letters from all our readers. Please direct your correspondence to: Letters to the Editor, FAMILY COMPUTING, 730 Broadway, New York, NY 10003. Include your name, address, and phone number. We reserve the right to edit letters for length and clarity. Due to the large volume of mail we receive, we are not able to respond personally to every letter.



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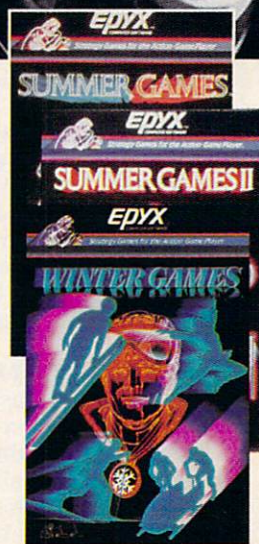
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# HOME-SCHOOL CONNECTION

## TAKE THE DREAD OUT OF WRITING SCHOOL REPORTS

### Your Computer Can Ease the Way

BY ANN SABATINI BLASK

Homework reports are as common to every schoolchild's experience as class pictures or proms. They are usually not as happily anticipated, however. Children often find them time consuming, difficult to organize, and worse, tedious to edit and recopy. Using the computer to help out with the task can allay much of the tedium and can actually assist in emphasizing the learning, rather than the mechanical aspect of the project.

The computer can fill a variety of roles: as a storage center for notes, as a convenient scratch pad for writing outlines and rough drafts, and as a willing and accurate typist that's ready to print a clean copy every time changes are made to the text. Many students feel that the computer helps them improve the quality of their work, and that they have fun in the process.

Julie Rice, a twelfth-grader from Eden, New York, mixed myth and technology in a productive learning experience when she used her family computer to do a homework paper on Atlantis.

The assignment was an unusual one. Julie had to hand in her notes, an outline, an introduction, a conclusion, and a bibliography for a report, although the report itself was not required. "It was a lot of work," she says, "but it would have taken a lot more time if I hadn't used a computer."

Julie began her research at the library with a pencil and a stack of conventional 3" x 5" file cards. She gave each card a heading: General Information, Background, Geography, etc. As she scanned through dozens of reference books, she jotted notes on the appropriate card.

#### ORGANIZING ON-SCREEN

The next step was easy. Using *Writing Assistant*, a word-processing program by IBM, she outlined her rough draft. First she centered the title, ATLANTIS, at the top of the screen. A few lines below, she typed



one under the other: I. INTRODUCTION, II. BACKGROUND, III. LIFE.

Next, she typed in the file card information under the appropriate heading. Using the cut-and-paste function, she rearranged the information in the order she wanted it to appear in on her finished document.

A word processor makes rearranging words and paragraphs a fast and easy process. It allows you to view alternatives on-screen, so you can compare word-flow patterns and ways of presenting ideas. What would have involved major revisions had Julie been writing the introduction and conclusion by hand, or even using a typewriter, were minor changes with the computer. She could easily edit out words right on-screen, and add information that she had overlooked. It was also a simple matter to scroll down to the bottom of her document and type in the book, author, and page numbers shown on her file cards under the heading BIBLIOGRAPHY.

As always, she verified her spelling with *SpellStar* and then printed out the introduction and the bibliography. Finding that by using the computer the project had taken much less time than she had expected, and since she had all the information centralized on disk, she decided to go one better than the requirements of the project and actually write the full report. She even spun off a title page and table of contents.

Her grade? An "A" with extra credit.

Julie, like many students who regularly use a computer for homework assignments, feels that it allows her to use her time more productively, which results in higher quality work. One of the key time-saving factors is easier organization. The flexibility of the computer, for example, allowed her to start writing portions of her text before she had finished all her research. As she went along, she could note areas that needed more information, track the information down, and easily insert the new facts and paragraphs into the appropriate spots.

Using the computer in this way means less time spent on paper-shuffling and retyping. More time can be spent on research. Julie probably would not have been able to include as much information in the report had she written it by hand. It is also unlikely that the finished paper would have been as thorough and well organized.

#### RESEARCHING ON-LINE

Julie shares an IBM PCjr with her 14-year-old brother William. In their homework nook, a corner of the family room, they also have an Okidata Microline 92 printer and an IBM PCjr internal modem.

Both teenagers have been doing their homework on the computer since they received it as a joint gift last Christmas. Until that time, the

ANN SABATINI BLASK is a freelance writer from Orchard Hill, New York, whose articles have appeared in *Science Digest* and *Seventeen* magazine, among others.



only computer user in the family was William, a self-taught expert who started out with a Timex 1000 when he was 11. William uses *Writing Assistant* for most homework papers and is learning *WordStar* (by MicroPro International) as well.

His approach to a research paper is somewhat different than his sister's. "Since we began subscribing to CompuServe, I often do my research at home. I used it for a social studies report on the Civil War. It was simple," he says. "After calling the CompuServe phone number, I typed in my user ID number and secret password. From the main menu of the information-service index I selected REFERENCE/EDUCATION."

William chose Grolier's Academic American Encyclopedia from the REFERENCE menu and then typed in CIVIL WAR. After scanning the information on the screen to make sure it included the dates and places he needed for his assignment, he printed out a copy which he used to write the report and keep in his notebook for future reference.

#### LEARNING TO SELF-EDIT

"A computer serves a dual purpose," says Paul Mrha, who teaches 11th- and 12th-grade English at Eden Senior High School in Eden, New York. "It's the great communicator and information-processor, but it also allows students to play with words. That's very important."

"One of the most noticeable advantages," he says, "is that students are more objective when they use a computer. When you create something by hand, whether it's a piece of art or a written homework paper, it's far more difficult to criticize because it's so personal. On a computer screen you criticize via a machine. This allows writers to become their own editors and correct their mistakes."

"At home I see that my own children find it easier to work with language," says Mrha, whose four teenagers all use the family Apple for homework assignments. "Proofreading or revising an essay, then re-copying a corrected version can be very tedious, but when you're correcting misspelled words and doing revisions on a video monitor, it's fun. Maybe it's the kid in all of us. We'd rather play than work. But while you're playing, you are improving your language skills."

**NEATER, TIGHTER WORK**

Starting the writing process on the computer often seems easier than when you are faced with an empty sheet of paper. You put in your disk, make sure there's paper in the printer, and you're ready. You know at the outset there will be no need to write it over.

The ease may also involve what Julie terms the "clutter factor."


"The dining room table used to be a maze of books, paper, pencils, pens, and erasers. To recheck your notes, or look something up in a

textbook, seemed only to add to the confusion. When your notes are saved on a disk, you have all your information in one place. You can always print a copy to use as a guide as you write the assignment, or you can refer to your file of notes on the computer screen when you need to. I can work better and faster without the clutter. You don't have to search the house for the dictionary your brother or sister left under a pile of magazines."

This can be true for kids of all ages. Kristen Bleyle, a ninth-grader from Williamsville, New York, uses an Apple IIe and *Bank Street Writer*, by Broderbund, for recording notes, checking sentence structure, and, on a regular basis, for writing and editing her homework. "First I go to the library and take notes," Kristen says. "When I get home, I type all the notes into the computer and check to make sure everything I have written is in complete sentences. Then I rearrange things and print a copy out on our Apple printer to take to school. I always ask first if it's OK to turn in computer homework. So far, every teacher has said 'yes.' I get better grades because there are not erasures or black marks on my papers."

At an early age, Kristen is learning the advantage of careful editing. One of the most tedious parts of any written work is checking the finished product for repetition of ideas or words, and for grammatical or structural errors. Correcting an improperly worded sentence on a typed or hand-written document usually means writing (or typing) the entire page over again. The alternative is "just letting it go."

"I don't measure the benefit of the computer only in terms of grades," says one parent. "I'm more interested in knowing that my children are using the computer to stimulate their creativity and improve their reading and language skills."

Although the computer won't do the actual research or report-writing, of course, it can help streamline the process so students have more time to pursue research and hone their work. By turning report-writing into a "computer project" as well, learning takes place on both fronts and becomes fun, too. And that is probably one of the most important contributions a computer can make to a child's growing-up experience—making the learning process enjoyable. 

### TIPS FOR TROUBLE-FREE REPORT-WRITING

Here are some suggested guidelines for using the family micro for homework reports. Try them and then adapt them to fit your particular work habits and the requirements of the teachers in your school.

**1.** Always check with your teachers first to see if it's OK to turn in computer-printed homework. If they prefer you to submit papers written out in longhand, you can still use the computer to store and collate your notes, and to help you edit your work before putting pen to paper for the final copy.

**2.** Print study notes on plain three-ring paper, or use a paper punch to make holes so you can insert the printed sheets into your notebook.

**3.** Print on one side of the paper only, to make it easier to read.

**4.** Double-space your composi-

tions, book reports, and term papers.

**5.** Leave at least a one-inch margin on each side for teachers' comments. It also gives a neater, "airy" look. Learn to set tabs that do indents and columns.

**6.** If you have a spelling-checker program, use it religiously. If not, keep a dictionary close to your computer so you can easily look up words you are unsure about.

**7.** Learn to reread and experiment with editing on the screen. Make sure to correct punctuation and grammatical errors before printing out a hard copy.

**8.** If you use continuous-feed paper, tear off punch-holed edges along the perforation (or cut off the edge if the paper has no perforation line). Separate the sheets for a neater look.



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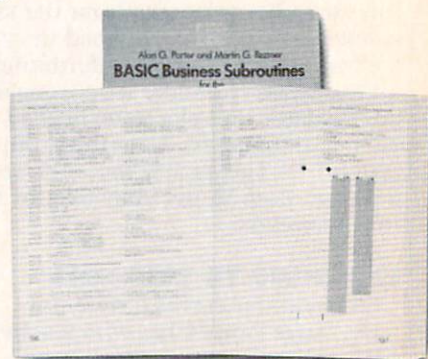
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2

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1a

1b

1c



# HOME/MONEY MANAGEMENT

## PREPARING YOUR FEDERAL INCOME TAX

### From CPAs to CPUs

BY LAWRENCE J. TELL

*Taxes are what we pay for civilized society.*

—Oliver Wendell Holmes, Jr.

Let's face it. Taxes are taxing, and computer programs that ease the job of figuring your tax bill won't make you any happier sending in that check. But software that takes you step-by-step through the numerous forms and schedules you've grown to hate can measurably reduce mental wear and tear at tax time.

By examining a single tax preparation software package in detail, we'll see what these potentially time- and money-saving tools can do for you. Several complete packages exist for filing just about any joint or individual federal income tax form (see the accompanying chart on page 12), from plain old Form 1040 through arcane Schedule W (deduction for working couples) and Form 2441 (credit for child-care expenses). One such program is *Tax Preparer* from HowardSoft.

If you get by with a 1040A or 1040EZ, however—one of the "short forms"—most tax prep programs would be overkill. You'd vent your ire not at the IRS, but at the computer.

If, on the other hand, you've got any number of complicating factors in your tax picture (those "problems" that, with some effort, can sometimes turn into deductions), then computerized tax prep may be for you. Even better, on some packages you can keep family finances on a related home-finance program, and then slip the information electronically into the tax program when April 15th rolls around.

### TRADING YOUR CALCULATOR FOR A COMPUTER

Let's assume you're giving up pencil and pad for disks and CPUs. The fun doesn't start until, as usual, you gather all your financial records and sort them into the appropriate categories: wage and bank statements

with other income, medical bills and mortgage payments with deductions, and so on.

*Tax Preparer* is set up like an electronic filing cabinet. You can start up front with the standard Form 1040, or dig deep to pull out a special form for figuring a capital gains tax on sales of stock, for example. The program also transfers numbers from the data you enter into appropriate places like the infamous line 34a, where itemized deductions from Schedule A must be entered.

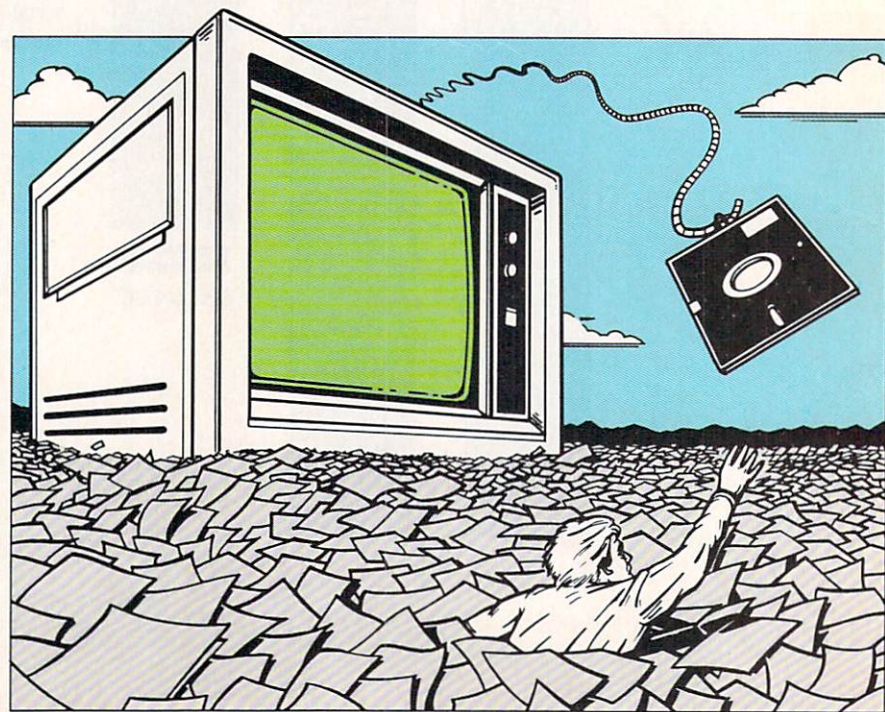
The program leads you through the simple questions: your name, your spouse's name (although *Tax Preparer* won't accept a different last name for your mate), number of dependents, filing status, and so on. One nice feature of *Tax Preparer* is that it won't let you make dumb mistakes like claiming more dependents than you list or itemizing a deduction for charitable contributions twice (once on Schedule A and once on your 1040, where only non-itemizers can take that deduction).

Numbers come next. Type in your wages, then your spouse's wages. If you received W-2 forms from more than one employer, *Tax Preparer* automatically adds them together. By now, you've reached the line for

reporting gains and losses on stocks, bonds, or other investments. No need to scramble for the paper version of Schedule D; it pops up on-screen. The same method holds true for any form or schedule. After you've run through the gains/losses form, jump back to the 1040. The appropriate tax loss (if you took a beating in the stock market last year, for example) is stored on the disk and shows up on the proper line of Form 1040.

After entering salary and capital gains or losses on the 1040, *Tax Preparer* knows you owe the IRS a whopping \$15,000 in taxes! It's not an error. The program keeps a running tab on your tax bill. Every time you add a deduction or change a figure, the amount of taxes due is recalculated from the appropriate tax table. The final computer-printed version of your tax forms will show only the final calculated numbers.

By the way, *Tax Preparer* generates either a quick print of your paperwork or final forms suitable for IRS filing—with one major exception. The 1040 must be filed on a preprinted, official IRS form. (Another program, *MacInTax*, does allow a computer-printed Form 1040, but that's the only one we found.)



LAWRENCE J. TELL is a financial journalist in New York City. His last article for FAMILY COMPUTING was "Putting Your Finances in Order" in the January 1985 issue.

ILLUSTRATION BY BRAD HAMMOND





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# HOME/MONEY MANAGEMENT

## SAVING MONEY THE "WHAT IF?" WAY

Constant recalculation is a handy tool for making some tough financial decisions. Say you're wondering whether to sock \$2,000 into an IRA account this year. Every IRA dollar counts as a deduction and every deduction reduces your tax bill. But it's not a dollar-for-dollar trade-off. Your tax savings depends on your "tax bracket," which is IRS lingo for the percentage rate at which your top dollar of income is taxed. In the highest bracket, each dollar of income is taxed 50 cents. Lower brackets can be pegged at 10 cents on the dollar or no tax at all. Paradoxically, deductions also are valued at 50 cents per dollar in the 50 percent bracket, but count for less in lower brackets.

If all this sounds confusing, don't worry. Just type in a hypothetical IRA contribution of \$2,000 on line 26 and see how your tax bill

changes. On our test return, using a married couple with each partner working and earning \$40,000 apiece, a \$2,000 IRA would save \$840 in taxes. Put another way, after taxes it costs only \$1,160 to save a full \$2,000.

The same logic works for renters thinking of buying a house. Home mortgage interest and property taxes are deductible from income tax under current law. Rent is not. If you figure a new house will cost \$400 a month in interest and taxes before tax deductions, you can enter that sum on the appropriate lines. Check the tax total, and you'll see a tax break worth \$167 a month (at least in the bracket I tested).

Tax programs serve more immediate financial needs, too. Anyone who's ever completed a Schedule G for income averaging will instantly understand the joys of computerized tax prep. Requiring tedious calculations, the manual version is de-

signed to see if you can save taxes by averaging this year's higher income with lower earnings in the prior three years. Working by hand, Schedule G requires 15 calculations to fill 28 lines.

With *Tax Preparer*, you simply enter three figures from your old returns and watch the other numbers fall into place. Nothing else is required. And income averaging often pays off. For one of our sample couples filing separate returns, Schedule G-averaging knocked \$862 off an \$8,000 tax bill, using the regular tables—a tax break of better than 10 percent.

## PROBLEMS WITH TAX PREP PROGRAMS

One bug cropped up in our test program, however. The 1040 main form didn't automatically use a lower tax from Schedule G unless specifically instructed. Even worse, the

## TAX PREPARATION SOFTWARE

In addition to the schedules and forms listed for each title, this selection of software can help you prepare the IRS Form 1040 ("the long form"), as well as Schedules A, B, C, G, W, and Form 2441. The update price is the publisher's charge for

a yearly upgrade, which incorporates any IRS changes. Under "Comments," "S/F" stands for schedules and forms. Some programs print your tax return on official IRS forms only; others will produce copies on regular computer paper—"plain

paper facsimiles." Forms 1040, 1040A, and 1040EZ (the "signature forms") cannot be facsimiles, except with *MacInTax*. Minimum memory requirements are 48K for Apple, 48K for Atari, 128K for IBM PC/PCjr, and 128K for Macintosh.

TITLE/ PUBLISHER/PRICE	HARDWARE	ADDITIONAL SCHEDULES/FORMS	COMMENTS
<b>J.K. Lasser's Your Income Tax</b> Simon & Schuster (212) 245-6400 \$80-\$80; \$30-\$40 for update	64K Apple, C 64, IBM PC/XT/PCjr, Macintosh.	Schedules D, E, F, R, SE, 1. Forms 1040A, 1040EZ, 2106, 2119, 2210, 3468, 3903, 4562, 4625, 4684, 4797, 5695, 6251, 6252.	Prints S/F on official IRS forms. Can also print summary for tax backup purposes. Includes section for calculating and note-taking. Good for tax planning, too.
<b>MacInTax Federal</b> Softview (805) 388-2626 \$75; \$30 for update	Macintosh.	Schedules D, E, R, 1. Forms 1040A, 1040EZ, 2119, 3903, 5695, 6252.	Prints S/F on official IRS forms or plain paper, including the 1040. Supplements available with nine more S/F, or for CA or NY state taxes (\$30 ea).
<b>PC/Tax Cut</b> Best Programs (703) 931-1300 \$195; \$75 for update	IBM PC and compatibles.	Schedules D, E, F, SE, Forms 1040ES, 2106, 2119, 2210, 3468, 3903, 4562, 4797, 4952, 5695, 6251.	Prints on official Form 1040, or on plain paper facsimiles for other S/F. Can accept info from Best's <i>PC/Professional Finance Program</i> .
<b>Swiftax</b> Timeworks, Inc. (312) 948-9200 \$50-\$70; \$25-\$35 for update	Apple, C 64/128, IBM PC/PCjr and compatibles.	Schedules D, SE, 1. Forms 1040A, 1040EZ.	Prints S/F on official IRS forms or plain paper facsimiles. With on-line IRS instructions and password protection.
<b>The Tax Advantage</b> Arrays/Continental (818) 994-1899 \$70; \$35 for update	Apple, Atari, C 64/128, IBM PC/PCjr.	Schedules D, E, SE, Forms 2106, 4562, 6251.	Prints S/F on official IRS forms or plain paper facsimiles. Can accept data from <i>The Home Accountant</i> . Also useful for tax planning.
<b>TaxAid III</b> TaxAid Software (218) 834-3600 \$40; \$13.50 for update	C 64/128.	No additional schedules/forms.	Prints plain paper facsimiles of S/F. Allows only whole dollar amounts. Schedule G won't work if you're married and filing separate returns.
<b>Tax Command Professional</b> Practical Programs (414) 278-0829 \$40-\$60; \$20-\$30 for update	64K Apple, C 64/128, IBM PC/PCjr and compatibles.	Schedules D, E, R, SE, Forms 1040ES, 2106, 2119, 3903.	Prints S/F on official IRS forms. Contains calculator function for quick computations.
<b>Tax Preparer</b> HowardSoft (619) 454-0121 \$250-\$295 \$75-\$95 for update	64K Apple, IBM PC/PCjr and compatibles.	Schedules D, E, F, R, SE, Forms 2106, 2119, 2210, 3468, 3903, 4562, 4797, 5695, 6251.	Prints on official Form 1040, or on plain paper facsimiles for other S/F. Can enter tax info for next year's taxes, too. Good for tax planning. A complete manual helps.
<b>Tax Return Helper</b> KSOFT Co. (312) 961-1250 \$33; \$22 for update \$45 (professional); \$30 for update	C 64/128.	Schedules D, E, SE, Forms 2106, 4562.	For tax calculations only; prints S/F in professional version only. Contains separate program for tracking expenses during year, then transferring at tax time.
<b>TaxWizard '85/86</b> Gamma Productions (213) 451-9507 \$65; \$33 for update	64K Apple (with two disk drives), 128K Apple, C 128, IBM PC/PCjr, Macintosh.	Schedules A, B, C, D, E, G, W, SE, Forms 1040A, 1040, 2106, 2119, 2441, 3468, 3903, 4137, 4562, 5695, 6251.	For tax calculations only. User must transfer numbers onto official IRS forms, with copies enclosed in package. On-line help available on a line-by-line basis.



program didn't update the 1040 line showing Schedule G tax when other items, like the IRA deduction, changed on the main form. You're forced to call up Schedule G, then exit, to get the accurate tax number on the main form.

Quirks like that abound in many tax prep programs. Some software, like *Tax Preparer*, have one-way data entry. That means if you put a number directly on the main form (say, interest income that normally must go first on Schedule B), you can't be sure subsequent changes on Schedule B will get picked up. It's always best to work from the more specific forms to the more general, ending with Form 1040.

HowardSoft's documentation gives some basic tax information to help you understand the forms you're filling out. Be warned, however: Computer help (on-screen or off-screen) is no substitute for good tax advice from an accountant or a detailed how-to reference book (some of which can be ordered free from the IRS).

Finally, these programs are always playing catch-up with changes in the tax laws. If a major tax reform bill passes Congress, programmers will be forced back to the drawing boards for extensive revisions. HowardSoft promises to provide yearly updates, but the sweeping tax law reforms possible in 1986 could complicate that task. Tax simplification may make tax prep programs unnecessary for the majority of taxpayers, too. No one can predict what Congress will do, so software shoppers should remember to keep one eye on the headlines from Washington.

## STATE AND LOCAL INCOME TAXES

For state or local income taxes, you will need a separate software package, only a few of which are available. I wish I'd had one last year for my New York state tax return. Fortunately, the state has a computer program of its own. After trying several legal tactics to trim my tax burden, I blew the eraser dust off my pocket calculator and figured that I owed New York State \$306.80. A few months after I'd dutifully sent in the check, a printout arrived in the mail from the state government. It claimed that I'd overpaid by \$60.79, and a check for that amount was enclosed. I didn't bother to double-check that computer's math. **FC**

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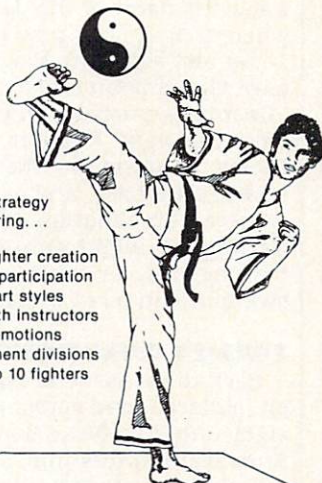
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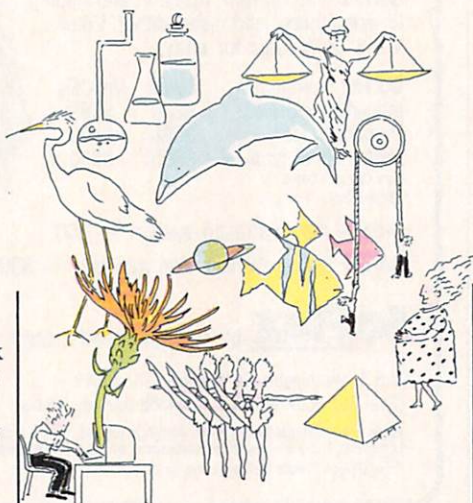


# TELECOMPUTING

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Doctors, Lawyers, Students, Marketers, Investors, Journalists, Engineers (and People Like You) Can Access a Sea of Specialized Data—Without a Degree in Library Science!

BY NICK SULLIVAN



My wife, Debbie, wanted access to the body of research on pregnancy and childbirth and its effect on work and career, but she didn't have time to drive to and browse through a good library. So she turned to a new electronic information service called EasyNet.

EasyNet is available to anyone with a computer, a modem, and a credit card. Just dial 800-EASYNET, and you'll be greeted by: WELCOME TO EASYNET, THE KNOWLEDGE GATEWAY. Fill in your credit card information and you're ready to go. (EasyNet is also available through Western Union's electronic mail service, EasyLink, where it's known as InFact.)

EasyNet purports to be the "largest single source of on-line data bases," and I wouldn't doubt that it has more information than most public and corporate libraries in the United States. It's certainly easier to use and more convenient. In effect, it's a public library gone private.

EasyNet gives you access to seven leading information services (such as Dialog, Newsnet, and BRS), which in turn give you access to 630 separate electronic data bases (see box). Each is filled with thousands of bibliographic references, abstracts, and often full-text articles. Included are many of the established data bases in various fields, such as Medline (for doctors) and Westlaw (for lawyers).

The beauty of EasyNet is that you don't have to know what you're doing to find the information you

want. A trained research librarian could tell you that you need, say, access to the Chemical Abstracts data base to find information on ocean desalination, and could tell you the system's command structure. But with EasyNet, you don't have to know the name of the data base, where to find it, or how to use it.

You just sign onto EasyNet and play what amounts to a game of "Twenty Questions." Once it knows what you want, EasyNet signs onto Dialog, requests the Chemical Abstracts data base, and asks for items on ocean desalination. While you're waiting you might want to put on a bathing suit, for you'll soon be swimming in a sea of data.

## TWENTY QUESTIONS

Back to the issue at hand—women, children, and careers. Debbie signs onto EasyNet, fills in her American Express info, and is given two choices: EASYNET I—WE PICK THE DATA BASE; or EASYNET II—YOU PICK THE DATA BASE. Sounds like a TV game show, and it's just as much fun.

Debbie picks EasyNet I, as most untrained researchers would, and is then asked whether she wants information on 1. SUBJECT, 2. PERSON, 3. PLACE, or 4. ORGANIZATION. She picks SUBJECT. From the next menu, with

a list of seven subject areas, she chooses SOCIAL SCIENCES. That field is narrowed with six more choices (HISTORY, PSYCHOLOGY, etc.), from which she picks SOCIOLOGY.

After a total of five menus, she is presented with these choices: 1. SCHOLARLY JOURNALS, 2. POPULAR MAGAZINES, 3. BOOKS ON SOCIOLOGY, 4. ENCYCLOPEDIA, and 5. LIST OF RELATED DATA BASES. Debbie opens door number 1 and is told: PLEASE ENTER YOUR TOPIC.

## FRAMING YOUR SEARCH

What is the topic? Debbie learned quickly that it was not PREGNANT WOMEN, because she got a lot of material unrelated to her search. When she entered PREGNANT AND WORK (after a while, you learn that WOMEN is understood), she got material of no interest to her, such as an item called "Fecundity Among Ethnic Groups in Hawaii." To enlarge the search and include American professional women, she entered PREGNANT AND WORK OR CAREER. This turned up abstracts on careerism that were only marginally related to pregnant women, such as "dual-income couples."

Starting over, instead of choosing SCHOLARLY JOURNALS, she chose LIST OF RELATED DATA BASES. Among others, Catalyst Resources for Women is listed, with a note that it specializes in "women's studies, especially employment." Perfect!

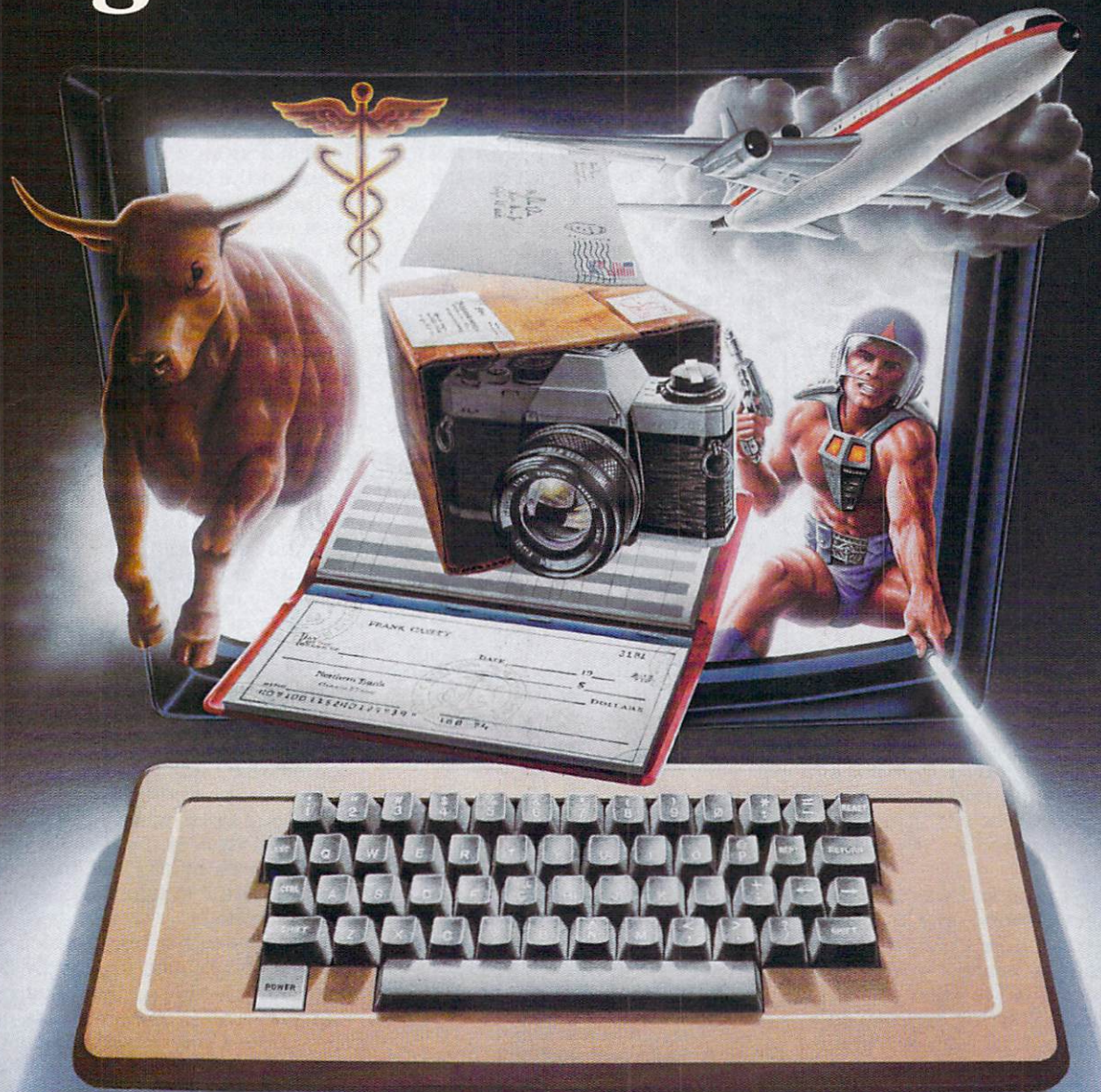
Then, when asked for her topic, Debbie pushed the "H" key for HELP and learned about two key searching tricks. One is the "wild letter," indicated by a "/", that you use to allow for a variety of word endings. For instance, PREGNAN/ finds "pregnant,"

NICK SULLIVAN is senior editor of FAMILY COMPUTING.

ILLUSTRATION BY MONA MARTH



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# TELECOMPUTING

"pregnancies," and "pregnancy." The second is using parentheses to set off groups of words so they are treated together.

Entering PREGNAN/ AND (WORK/ OR CAREER) on the Catalyst Resources for Women data base turned up 134 items that covered various aspects of the topic. The 10 most recent items, listed first, came from a wide variety of sources, such as *The New York Times*, *The Congressional Quarterly*, and the National Institute for Occupational Safety and Health.

Assuming you want one of the 134 options—if you don't, you can enlarge your search with new key words or try a different data base—you have several choices. In some cases, the full text of an article will be available on-line for you to read, save to disk, or print out. More likely, you'll be given a brief description of the contents and the chance to see an abstract (for an additional \$2), which is a more detailed accounting.

In some cases, even if the full-text isn't available on-line, you're able to order a photocopy or reprint of the article (\$10), and have up to five items sent by regular mail (\$8.50) or Express Mail (\$17.50). (Two notable data bases not included on EasyNet are LEXIS and NEXIS, which carry the full text of legal documents and materials from major publications, such as *The New York Times*.)

## S.O.S.

Besides its conventional HELP screens, EasyNet offers 24-hour on-line human assistance! Type sos at a command prompt, and a trained researcher with a master's degree in library science appears like a genie in a bottle.

Here's an example: I was looking for some background on Tim Wirth, a congressman from Colorado. My brother had just started working for him, and I wanted to know about the new boss. Starting on EasyNet I, I chose to search by PERSON. Then I asked for BIOGRAPHICAL INFORMATION. EasyNet proceeded to search the Marquis Who's Who data base, and came up empty. I tried ORGANIZATION, then asked for CONGRESS, and EasyNet searched the Encyclopedia of Associations. To no avail. So I typed SOS.

HELLO, THIS IS SUSAN, MAY I HELP YOU? I outlined my problem. TRY THE WASHINGTON POST. Brilliant!

I went back to the beginning, chose EasyNet II (so I could pick the data base), asked for *The Washing-*

*ton Post*, and got my background. After short stints working with EasyNet I, both Debbie and I learned that choosing our own data bases through EasyNet II was a superior search method. In fact, EasyNet I doesn't have access to as many data bases as EasyNet II.

## EASYNET RATES

One drawback to most professional or specialized data bases is their expense (up to \$150 an hour for use). If you don't know how to search properly, you'll end up living on bread and water (or your corporate sponsor will serve it at the next party). On EasyNet, you can take some time to think out your search; you pay only \$1 to use the system for as long as you want.

But, once you pick your topic (such as PREGNAN/ AND WORK), and EasyNet's wheels start churning, you pay \$8. (Thirty of the 630 data bases carry additional surcharges.) That's the basic "search fee," which is waived if nothing is found. For that \$8, you get a list of the 10 most recent items that fit your description and the full text of one (if available).

For each additional full-text dis-

## EASYNET INFO

To give an inkling of EasyNet's potential, the following data bases were chosen at random from a listing of 630 available. For sign-up information, call EasyNet (a division of Telebase Systems) at 617-484-2361. For a description of a particular data base, look in the Omni Online Database Directory, 1985 (Collier Books, New York, \$14.95).

Abstracts of Tropical Agriculture, Accountants, Adtrack, Africa News, Air/Water Pollution Report, American Banker, Aquaculture, Associated Press, Book-review Index, Books in Print, Chemical Abstracts, Child Abuse and Neglect, Cofeline, Congressional Records Abstracts, Dun's Market Identifiers, Disclosure II, Electronic Yellow Pages, Fiber Optics and Communications Newsletter, Forest, Gold Sheet, Harvard Business Review, Hi Tech Patents, Hollywood Hotline, Insurance Abstracts, Investext, Japan Computer Industry Scan, Japan Semiconductor Quarterly, Magazine Index, Medline, Mobile Phone News, Moody's Corporate Profiles, New York Times, Nuclear Waste News, Oceanic Abstracts, Outlook on IBM, Pacific Islands Ecosystems, Patlaw, Petroleum/Energy News, Population Abstracts, Public Broadcasting Report, Robotics Information, Sales Prospector, Small Business Tax Review, Space Commerce Bulletin, Television Digest, Toxic Materials News, U.S. Patent Office, Videotex Products, Wall Street Journal, Washington Post, Zoological Record.

play, you pay \$6. To see a list of each additional 10 items, you pay \$6. You don't need a calculator to see that your bill can mount quickly. Every time you accrue new charges, an update of your fee appears on the screen, which will prevent you from unwittingly running up a big bill.

This leads to an obvious question: Who besides the idle rich can afford EasyNet?

## WHO CAN BENEFIT

Turn the question around: How much is "Exhibit A" worth to you? If you're looking for a specific piece of information and have to travel five hours to the New York Public Library or the Library of Congress to get it, then even a \$50 EasyNet bill might be cost-effective. And since most people who make good use of EasyNet do so for professional reasons—such as journalists, college professors, doctors, lawyers, engineers, etc.—the search fees can often be billed to a client.

Of course, one main advantage to EasyNet, depending on your job function, is that you can work from home (see "*HomeWork for Professionals*"). With the new "flex" schedules that more and more corporations are adopting, a service like EasyNet could alter your workstyle—maybe even help solve the PREGNAN/ AND WORK conundrum.

## MODERN MARVEL

EasyNet was just weeks old when I tried it, and small kinks were evident. Twice I was knocked off the system in the middle of a search. More than once, when I duplicated my menu choices, I got slightly different search results, raising a question about the system's consistency and accuracy.

But these minor bugs, which will probably be cleaned up, hardly detract. EasyNet is simply a modern marvel. David Chandler, in his book *Dialing for Data* (Random House, New York, \$9.95), suggests that up to 80 percent of materials published in the last 15 years can be found in a data base somewhere. Even if this figure is wrong by 50 percent and if EasyNet can reach only half of what's really there, your eyes will go bad before you pan through all that gold. ☐

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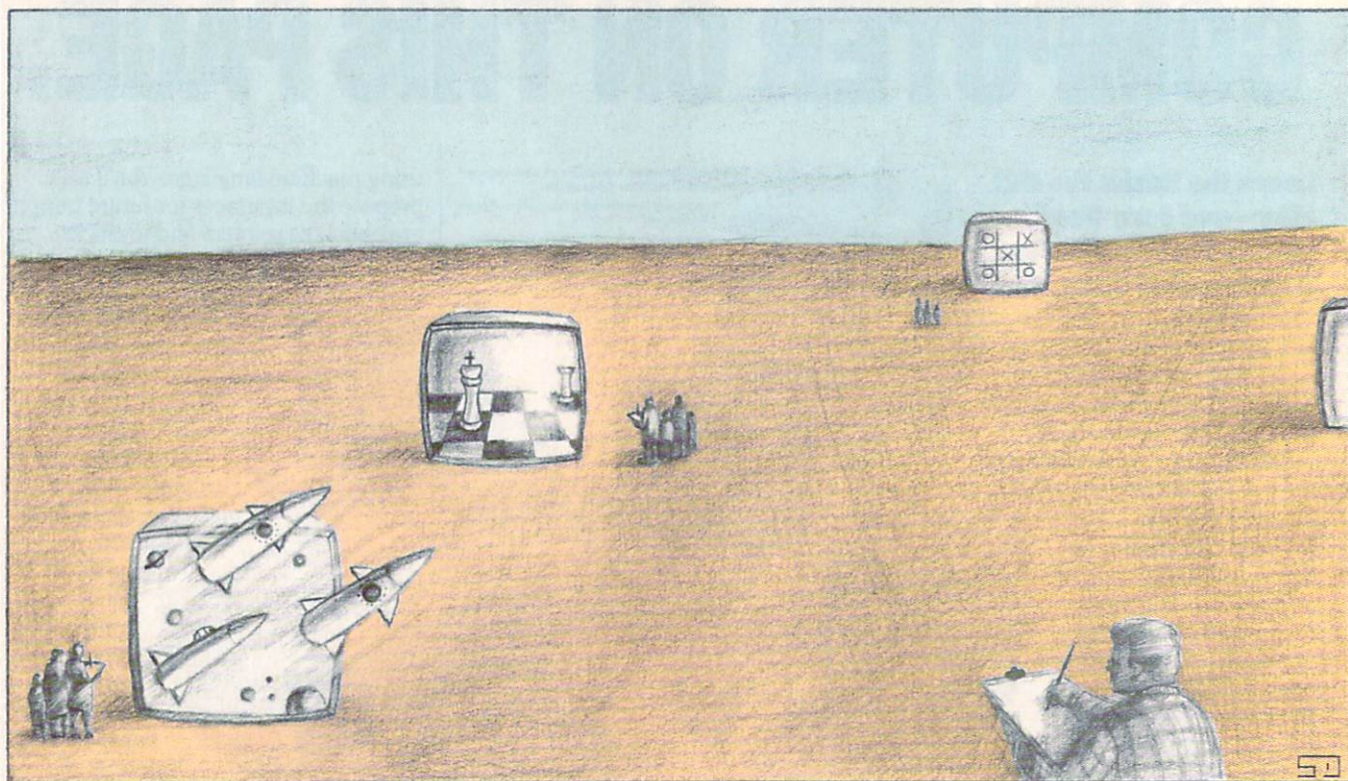
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# GAMES

## THE BEST FOR BEGINNERS

How to Add Lots More Fun to Your Computer **BY JAMES DELSON**



Who among us has never played a game? Whether it's guessing car manufacturers on long automobile trips, or playing "20 Questions" while waiting in line for a movie, gaming has touched us all.

But while word, board, and card games have long been an inescapable part of American life, computer games are a relatively new addition to the cultural mainstream. The most archaic coin-operated arcade games are only in their early teens, and the vast majority of games for micros aren't even six years old!

All this is meant to soothe those of you who have either just acquired a computer, or who have finally decided to give computer gaming a try. There are hundreds of fun programs out there, as anyone who visits a local computer store or reads this magazine must know.

My regular column is written for players of varying abilities. But this

column is devoted entirely to newcomers. Are you looking for games that don't demand a great deal of expertise? Then read on . . .

### CHOOSING THE RIGHT GAME, CATEGORY BY CATEGORY

Newcomers to computer gaming should be aware that there are different types of programs available. These are called game genres. In the paragraphs below, you'll find a rundown of the major genres and some popular subgenres.

Once you've decided which genre(s) appeal to you most, the next question is: Which games are the best? Here's my selection of tried-and-true, beginner-level programs. All have been highly rated by playtesters for their long-term play value. That means you won't grow bored with these games once you've learned to play them.

#### ADVENTURES

In this game genre, players are asked to participate in a story. Novices and experts alike have made

**role-playing adventures** the most popular genre among computer gamers. *Wizardry I* is enjoyed by sword-and-sorcery fans. If you wish to quest through strange lands, try *Temple of Apshai*.

**Text/graphic adventures** are long and involved adventures in which you play the central role. Solve puzzles, take chances, and enjoy the ride. Two good text/graphic adventures designed for novices of all ages are based on classic children's stories: *The Hobbit* and *Swiss Family Robinson*.

With **text-only adventures**, you'll find no pictures (you provide those in your head), but you will encounter a series of hair-raising thrills and tough puzzles. *Adventure* (yes, that's the title) is the original, the one that all beginners should taste. *Wishbringer* is Infocom's easiest offering for newcomers.

#### ARCADE

Here's a test of your hand-eye coordination that utilizes rudimentary strategies. This is the simplest sort

JAMES DELSON, the games critic at FAMILY COMPUTING, will talk next month about starting your own playtesting group.



of computer game to learn because it demands little except your rapt attention. *B.C.'s Quest for Tires* is an ideal intro for children. *Raid on Bungeling Bay* is more sophisticated, better for adults.

## FINANCIAL SIMULATIONS

These are for folks who want to replicate businesses, both big and small. Such games provide very rewarding experiences, even though the genre is probably the most difficult to learn. Financial simulations are educational as well as enjoyable. For a straight stocks-and-bonds trading scenario, play *Cartels and Cutthroats*. *Rails West!* is as much a role-playing game as a re-creation of high finance.

## SPORTS

With digital athletic programs, players can closely approximate real-life football, baseball, and more. People of all ages can get into these games in no time and enjoy their re-

alistic simulations of sports action. *Summer Games* delivers a broad spectrum of play with its 10 Olympic events. Pretend you're a pro football coach with *Super Bowl Sunday*.

## STRATEGY AND TACTICS

This is a genre that lets you plot military actions. These games teach clear, logical thinking, but comprise another difficult field to enter. Join the campaigns of Julius Caesar with *Legionnaire*, an easy to understand and fast-paced game. *Knights of the Desert*, a World War II simulation, is good for novices because there's less to keep track of than in most war games.

## POLITICAL SIMULATIONS

Did you know you can run for president, resolve world problems, or found, undermine, or dominate civilizations? We call those programs "political" games. The trick here is in interacting not just with the computer, but with other people as well.

*President Elect* takes you into the closing weeks of a "typical" American presidential campaign. With *Colonial Conquest*, you have the opportunity to take over other countries.

## SIMULATORS

For those who've dreamed of taking the controls of a jet plane, or commanding a submarine, at last you've got the chance. *Gato* simulates submarine warfare in World War II. It's remarkably easy to learn, but takes an effort to master. Boot up *Jet*, and you're in the cockpit of a modern fighter and are launched into the air right away.

## BOARD GAME ADAPTATIONS

If you want computer versions of traditional favorites, like chess, this group could be your speed. Now you can play your old favorites again, while using the computer as an opponent (or as a referee in two-person games). *Armageddon*, a computer version of Risk, is much more fun than the original. The best chess program—*Sargon III*—is also the best chess teaching tool.

## CONSTRUCTION SETS

Especially popular on microcomputers, these programs offer pre-packaged "spare parts" as tools for assembling your own games. First you have the pleasure of designing your games, then you can play them to your heart's content. As enjoyable to make as to play, *Mail Order Monsters* encourages beginners. The classic arcade game *Lode Runner* is also a great construction set.

## HYBRIDS

Some games combine elements of the genres listed above into forms such as role-playing/arcade, political/financial, and strategy/arcade. The cream of computer-gaming design is found in these mixtures. *Seven Cities of Gold* is a newcomer's delight; explore a continent. *M.U.L.E.* is like Monopoly, but takes place on another planet.

**Strategy/arcade** games are more difficult than the straight arcade versions, but less challenging than pure strategy and tactics. These games will give years of pleasure. *Archon* is like playing chess with living pieces, but is easier than it sounds. *Impossible Mission* is more like participating in a James Bond movie. **FC**

# GAME INFORMATION

Minimum memory requirements are 48K for Apple II, 48K for Atari, 128K for IBM PC/PCjr, and 128K for Macintosh.

**Adventure:** (one of four games in a package called *Golden Oldies*) Software Country, distributed by Electronic Arts; (415) 571-7171. Apple, Atari, C 64/128, IBM PC/PCjr, Macintosh. \$30-\$35.

**Archon:** Electronic Arts; (415) 571-7171. Amiga, Apple, Atari, C 64/128, IBM PC/PCjr. \$23-\$35.

**Armageddon:** Social Software, Inc.; (313) 751-2643. IBM PC/PCjr and compatibles. \$30.

**B.C.'s Quest for Tires:** Sierra On-Line; (209) 683-6858. Apple, Atari, C 64/128, IBM PC/PCjr. \$25-\$35.

**Cartels and Cutthroats:** Strategic Simulations, Inc.; (415) 964-1200. Apple, C 64/128, IBM PC/PCjr. \$40.

**Colonial Conquest:** Strategic Simulations, Inc.; (415) 964-1200. Atari, C 64/128. \$40.

**Gato:** Spectrum HoloByte, Inc.; (303) 443-0191. 128K Apple IIe/IIc, IBM PC/PCjr, Macintosh. \$40-\$50.

**The Hobbit:** Addison-Wesley Publishing Corp.; (617) 944-3700. Apple, C 64/128, IBM PC/PCjr. \$30-\$35.

**Impossible Mission:** Epyx; (408) 745-0700. Apple, C 64/128. \$39.

**Jet:** subLOGIC; (217) 359-8482. C 64/128, IBM PC/PCjr. \$40-\$50.

**Knights of the Desert:** Strategic Simulations, Inc.; (415) 964-1200. Apple, 40K Atari, C 64/128, IBM PC/PCjr. \$40.

**Legionnaire:** Avalon Hill; (301) 254-5300. Apple, Atari, C 64. \$30.

**Lode Runner:** Broderbund Software;

(415) 479-1170. Apple, Atari, C 64/128, IBM PC/PCjr, Macintosh. \$35.

**Mail Order Monsters:** Electronic Arts; (415) 571-7171. C 64/128. \$33.

**M.U.L.E.:** Electronic Arts; (415) 571-7171. Atari, C 64/128. \$23.

**President Elect:** Strategic Simulations, Inc.; (415) 964-1200. Apple, C 64/128. \$40.

**Raid on Bungeling Bay:** Broderbund Software; (415) 479-1170. C 64/128. \$30.

**Rails West!:** Strategic Simulations, Inc.; (415) 964-1200. Apple, 40K Atari, C 64/128. \$40.

**Sargon III:** Hayden Software; (800) 343-1218. Apple, Atari, C 64/128, IBM PC/PCjr, Macintosh. \$50.

**Seven Cities of Gold:** Electronic Arts; (415) 571-7171. Apple, C 64/128, IBM PC/PCjr. \$33-\$40.

**Summer Games:** Epyx; (408) 745-0700. Apple, Atari, C 64/128. \$40.

**Super Bowl Sunday:** Avalon Hill; (301) 254-5300. C 64/128. \$35.

**Swiss Family Robinson:** Windham Classics, a division of Spinnaker; (617) 494-1200. Apple, C 64/128, IBM PC/PCjr. \$27.

**Temple of Apshai:** Epyx; (408) 745-0700. Apple, Atari, C 64/128, IBM PC/PCjr. \$39.

**Wishbringer:** Infocom; (617) 492-6000. Amiga, Apple, Atari, C 64/128, IBM PC/PCjr, Macintosh, Tandy Model III. \$35-\$40.

**Wizardry I:** Sir-Tech Software; (315) 393-6633. Apple, IBM PC/PCjr, Macintosh. \$50-\$60.





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e = Educational h = Home Use r = Recreational

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...	...	...	r	Ancient Art of War
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\$30	...	...	\$30	King's Quest 2 (AP2 Soon)
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\$28	\$23	\$23	\$28	e/r	Seven Cities of Gold
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# COMPUTING CLINIC

## TIPS ON BUYING A COMPUTER SYSTEM

BY JEFFREY BAIRSTOW

**I want to purchase a computer for home management, educational, and small business use. I need enough information so I will not be at the mercy of a salesperson. No one would try to buy a car without being able to test-drive it—yet I don't know how to "drive" a computer! Here are my questions:**

LLOYD M. TAPPANA

Soldotna, Alaska

### Given my needs, what computers should I consider?

Ask six people your question and you're likely to get six different answers. So take my answer as a subjective one! As a beginner with a wide range of potential uses for your computer, it's important to choose a machine that's widely available, has lots of software, and can be supported and serviced, if necessary, by a local computer store. I feel the computers that best meet these requirements and seem to fit your needs are the Apple IIc and the IBM PC. If you consider the IBM PC, you should certainly also look at one of the lower-priced IBM compatibles, such as the Tandy 1000 or the Leading Edge Model D.

If you're likely to use your computer mainly for entertainment, personal-finance, and educational purposes, I'd recommend the Apple IIc. If your small-business uses—such as word processing, financial record-keeping, and budgeting—are going to be more significant, I'd choose the IBM, Tandy, or Leading Edge computer for the extensive library of business software they run and their larger potential memories.

### Will I need a disk drive? And what is the difference between a hard and a floppy disk drive?

Since almost all programs come on floppy disks, you'll need a floppy disk drive to run them. A second disk drive for storage of programs and data is a luxury for many people, but a necessity for running most high-performance business programs. Two disk drives are also a big help when making backup copies of valuable disks. With only one drive, you'll have to do a lot of tedious disk-switching.

Floppy disks look like flexible 45-

rpm records stored in a square, protective cover. On the Apple IIc's built-in drive, a floppy disk can store about 84 double-spaced pages, while on the IBM PC, a disk can store over 200 pages. Either way, for most home applications (even financial record-keeping), floppy disks provide plenty of storage.

However, for business use—in which extensive storage is often needed—an alternative is to use a hard disk drive. Most hard disk drives store 10 or 20 megabytes of data, or about 6,000 to 12,000 pages. A hard disk is rigid; most cannot be removed from the drive, as a floppy disk can. When you fill one up, you must erase files (making backups first, of course!) to make room for new ones. Hard disks have so much storage space that you can keep all your programs (word-processing, spreadsheet, and communications, say) on the disk, and access them more quickly than you could if you had to continually switch floppy disks. Even if you use a hard disk drive, you'll still need a floppy disk drive to load programs onto the hard disk drive. Hard disk drives, it's worth noting, require some skill to use and to back up.

### What kind of printer do I need?

You have two choices: a letter-quality printer, which will produce fully-formed letters (as a typewriter does); or a dot-matrix printer, which will produce letters made up of tiny dots. Dot-matrix printers are faster and can print graphics. For most home use, a good dot-matrix printer with a "near letter-quality" mode is all you need. If you intend to print a lot of business correspondence or reports, you'll get the most professional look with the slower letter-quality printer.

### Do I need a monitor?

To do the kind of work you're talking about, you'll need a monitor that can display 80 characters across the screen. However, for most game and educational software, you'll want a color monitor. Do you need to buy two monitors? No. The IBM PC Color Display, Tandy CM-4 or CM-2 monitor, and Apple ColorMonitor IIc can display both color and 80-column text. For people with "crossover needs," these dual-purpose monitors make real sense. **FC**

JEFFREY BAIRSTOW is a contributing editor for FAMILY COMPUTING magazine.



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(Apple/IBM); retails for \$499.

## GRAND PRIZE



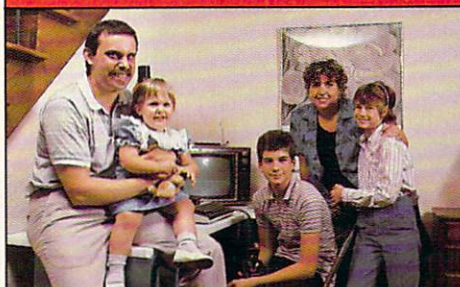
256K  
TANDY  
1000

with a CM4 RGB monitor,  
two disk drives, and DeskMate  
integrated software; retails for  
\$1,650.

## FIFTH PRIZE

\$250  
WORTH OF SOFTWARE  
from the following companies:  
Activision; Avalon Hill; Bantam  
Software; Batteries Included; Bet-  
ter Working Software; CBS Soft-  
ware; Davidson & Associates,  
Inc.; Electronic Arts; Epyx; Fish-  
er-Price; Gamestar; Hayden Soft-  
ware; Infocom; Microprose; Mi-  
crosoft Corp.; Mindscape Soft-  
ware; Random House; Scholastic  
Software; Sierra On-Line; Simon  
& Schuster; Spinnaker; Spring-  
board; Strategic Simulations  
Inc.; subLOGIC; Telarium; and  
Windham Classics (ten winning  
families in this category).

## 1985 WINNERS



1985 Grand Prize winners Rich and Kate  
Mancini, with son Matt and daughters  
Shannon and Tessa.

## SIXTH PRIZE

SEIKO PC DATAGRAPH  
MODEL RC-1000,  
a multifunction quartz wrist  
terminal which stores up to 2K of  
data. Required software and cables  
included; retails for \$150.

## HOW TO ENTER

We're proud to announce our second annual nationwide search for the "Computing Family of the Year." Yours could be one of the winning families featured in the pages of FAMILY COMPUTING. You could win a computer, monitor, or any other of the valuable hardware or software prizes that can increase your whole family's computing enjoyment.

## WHO'S ELIGIBLE

Any family that uses its computer in especially efficient, rewarding, and/or creative ways! Enter your own family, or perhaps that of a friend or a favorite teacher whose ability and versatility in computing you admire. Write and tell us why you nominate them as our "Computing Family of the Year."

## HOW TO WRITE YOUR ENTRY

Answer the following questions. You can number the paragraphs if you'd like, but it's not mandatory.

1. When and why did the family decide to buy a computer? What kind of computer did the family purchase?
2. How does each family member use the computer? Include names and ages.

3. Do the children use a computer in school? Is the computer at home used for educational purposes? If so, how?

4. How does the family use the computer together?

5. Which are the most efficient, rewarding, and/or creative ways the family uses its computer? If software is used, tell us the kinds.

6. In what ways has the computer changed family members or the way they live?

7. Has the computer lived up to original expectations? Has the computer's use evolved with time?

Also, we'd love to see a family photo—of the family computing, of course. (A casual snapshot will do.)

## CONTEST RULES

1. Your entry should run no more than 2,000 words, or about eight double-spaced, typewritten pages.
2. Scholastic Inc. employees, advisory board members, and members of their families are not eligible.
3. Previous winners of the "Computing Family of the Year Contest" are ineligible.
4. All entries and photographs become the property of Scholastic Inc., which reserves

the right to use them in publications and promotions. Unfortunately, Scholastic Inc. will not be able to acknowledge your entries. Entries and photographs will not be returned.

5. Include your address and phone number (or, if you are nominating another family, include its address and phone number).

6. No cash substitutions for prizes.

**Deadline:** All entries must be postmarked by March 31, 1986.

**Judges:** Entries will be judged by a panel of Scholastic employees. Judges' decisions are final.

**Winners:** The winners will be announced in the September 1986 issue of FAMILY COMPUTING.

# FAMILY COMPUTING

Nominating letters should be mailed to: Minerva Jimenez, Computing Family of The Year Contest, c/o FAMILY COMPUTING, Scholastic Inc., 730 Broadway, New York, NY 10003.



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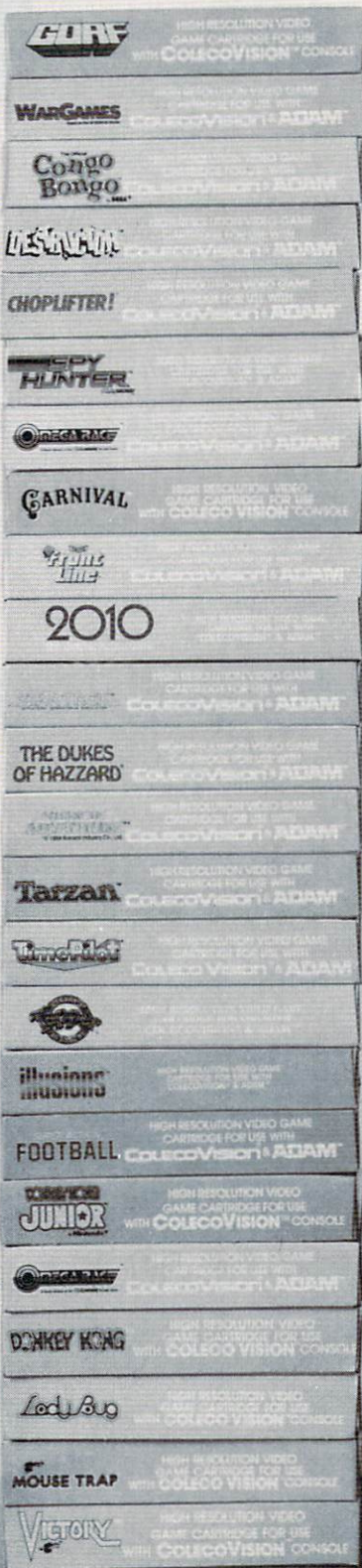
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\*Availability of some software programs subject to change.



FAMILY  
COMPUTING

# HOMEWORK FOR PROFESSIONALS

EVERYONE KNOWS  
THAT A COMPUTER  
AT HOME CAN  
HELP WITH  
OFFICE TASKS.

HERE'S A BASIC  
GUIDE TO WHAT  
IT CAN AND  
CAN'T DO.



BY CHARLES H. GAJEWAY

**A**lmost any professional can benefit from using a personal computer at home. I'm not talking just about the independent professional who works from home, but the "knowledge worker" (someone who collects and analyzes or reports information), specialist, manager, or executive who spends a normal working day in an office. All of these job types are largely dependent on information-processing, and computers are

superb managers of information.

You may or may not use a computer at the office, but in any case, a home-based computer can help you become better organized, more productive, and save you time. This extra time can be applied to learning new tasks. Over the long term, it can represent a big career advantage.

In this article, I'll explore the different ways a computer at home can benefit an office

PHOTOGRAPH BY JOEL WHITE





The first article contributing editor CHARLES H. GAJEWAY wrote for FAMILY COMPUTING was "Commuting with Computers: One Solution to Overdoing Overtime at the Office" in the October 1983 issue. The most recent was "Multifunction Integrated Software" in the October 1985 issue. As a financial planner, Gajeway has worked with computers at the office, at home, and on trains for more than five years.

worker, and present a method for analyzing your job to discover those tasks best suited for computerization at home.

There are several ways to work at home for little cost. The big myth I'd like to explode right away is that you need a sophisticated and expensive computer system, like those commonly used in big corporations, to achieve meaningful results at home. Clearly, this is true when you use such a machine at the office and want to take disks home to work evenings or weekends. But for many tasks, a 64K to 128K computer—of whatever type—with a disk drive and a printer is more than adequate.

You don't necessarily need expensive software, either, although multifunction integrated programs such as Lotus 1-2-3 and AppleWorks (see "Integrated Software" in the October 1985 issue) are undeniably powerful and convenient. It's quite possible to use relatively inexpensive programs, some of which you may already own, such as Bank Street Writer, FlashCalc, and the PFS: series, to achieve impressive results. This is especially true if you don't normally use a computer in your work and aren't already dependent on powerful business programs.

One cost-cutting possibility is "piggy-backing"—using office hardware to complement your home system. If your home equipment is compatible with IBM PCs at your office, you can prepare data at home and use sophisticated output devices at the office—high-speed, high-quality laser printers; letter-quality printers; or multipen plotters for graphs—to produce final output.

Even if your home system isn't directly compatible with computers at the office, it's always possible to transfer data over the telephone using a modem (see "Buyer's Guide to Modems" in the January issue of FAMILY COMPUTING). And in some cases, you may be able to use your computer and modem to communicate with your office's mainframe.

Successful working at home also depends on good desks, chairs, and overhead lighting. You may be more dependent on these important environmental and ergonomic items than you think, so take them into account when planning.

#### FOUR JOB TYPES

To a great extent, the kind of job you have will determine how often, how well, and when you can use a computer at home. Other fac-

tors, of course, include your living situation (number of kids, space, etc.) and the attitude of your company and boss.

In general, *the more you deal with people* and handle phone calls at the office, the more you must physically be there during working hours. But when you work at home, you probably won't need a sophisticated computer.

Conversely, *the more you deal with data*—either words or numbers—the less you need to be physically in the office. But you'll probably need a more powerful computer system to manipulate your data.

Most jobs can be defined as falling into one of four general categories: **knowledge worker** (data-oriented), who collects, manipulates, analyzes, and reports information; **specialist** (data-oriented), such as an accountant, lawyer, engineer, or researcher, who carries out highly technical tasks that require specialized training; **manager** (people-oriented), who directs and administers the efforts of a number of people to achieve a set of related tasks; and **executive** (people-oriented), who absorbs information from different managers on markets and performance, and makes decisions as to how business will be conducted.

#### CASE STUDIES

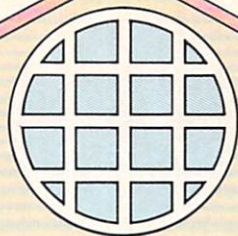
People in each of the above categories can benefit from using a computer at home, but the style and magnitude of use will vary widely. The following examples of office workers using computers at home (intended to spark your own ideas) are composites of real people I have worked with or known.

**Mark** is a "knowledge worker" in the financial industry. He helps regional managers prepare their annual plans, then adds individual plans together into divisional and company plans (a financial process called "consolidation"). Finally, he does comparative analyses of projected results against recent performance.

During the second half of a fiscal year, Mark would normally spend many overtime hours—including weekends—performing this complex, demanding task on his IBM PC at the office. To cut down on overtime at the office, Mark bought an IBM PC-compatible computer so he could spend evenings and weekends working at home instead of the office.

Since his consolidation work frequently requires letting the computer crunch numbers unattended for long periods of time, Mark can often spend most of his time both "working,"





and enjoying his wife and children. (To keep the computer busily working, he writes "macros," or long lists of commands, that tell the computer to do one task after another.) He even lets particularly long number-crunching procedures run overnight while he is sleeping. In the morning, he takes the disks to work and transfers their contents onto his office machine—a task that takes only a few minutes. Needless to say, Mark and his family are very happy with their computer investment.

**Elaine** is also very happy with her new Apple IIc, even though it is incompatible with the IBM PC and other word-processing computers in her office. A manager within the marketing division of her firm, Elaine is responsible for coordinating the preparation and production of the company newsletter, public-relations releases, and sales brochures. Continually involved in meetings, telephone con-

versations, and editing her subordinates' work, she found it increasingly difficult to do her own job-related writing and correspondence during office hours.

When her husband—a self-employed medical specialist with a growing practice—expressed the need for a computer to do billing and record-keeping, Elaine agreed readily—as long as the new system included a simple word processor for her. Now she often spends evenings drafting special projects and memos that she gives to her secretary or layout staff to put into final form.

Elaine finds herself much more productive, saying that things she can get done in three or four hours at home would often require several days to squeeze into her office schedule. Her staff is more productive, too, since they are working from neatly printed drafts instead of hastily scribbled manuscripts. Perhaps best of all, Elaine is much more relaxed and confident about meeting deadlines, and feels that she is doing her job better than ever.

**Wayne** is a sales executive for his firm, responsible for directing and coordinating the efforts of several sales teams within his region of the country. He spends much of his time in the field with staff and clients. His time at headquarters is spent analyzing results and making presentations. With all the people and information he has to deal with, Wayne found it difficult to stay organized and keep abreast of all the details of his job—until he began using the Commodore 64 he originally bought for his daughters.

With a data-base program, Wayne began keeping track of the performance of his sales teams, using information from weekly performance reports. Once a month over a weekend, he summarizes the results for his region and graphs them on a chart that shows ups and downs. The final picture has a clarity he says was impossible to achieve with words and numbers alone.

He also uses the data base to keep track of his schedule and travel expenses, eliminating the need to spend at least one full day a month trying to accurately sort out thousands of dollars worth of credit-card slips. He can even sort and summarize the time and money he spends by team and by client to get a better picture of how he distributes his efforts and budget.

Wayne is amazed at how much more control he has over his job with these few tasks

**ALMOST EVERY OFFICE JOB INVOLVES ONE OR MORE TASKS THAT CAN BE PERFORMED ON A COMPUTER AT HOME.**

**USING A COMPUTER TO DO OFFICE WORK AT HOME OPENS UP THE POSSIBILITY OF SIMPLY WORKING AT HOME.**

## WORK AT HOME VS. WORK AT THE OFFICE

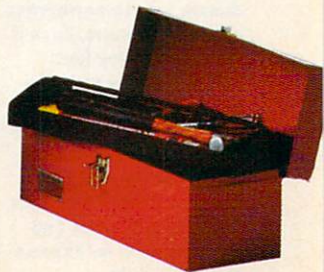
There are distinct differences between most home and office environments that have a big impact on the kind of work you can accomplish. These differences, the kind of work you do, the resources required, and the people you deal with all influence exactly what and how much you can realistically expect to accomplish at home.

**Office Pros:** In the office you have an eight- to 10-hour block of time during your freshest and most productive part of the day (at least it is for most people), have access to complete records and files, can draw on other employees' knowledge and information, and have use of equipment too expensive to own personally or too heavy to carry home.

**Office Cons:** You are subject to telephone calls, production schedules, and deadlines; have to sit through interminable meetings; play your role in office politics; and juggle many ongoing tasks.

**Home Pros:** You can devote your attention to a single topic, are usually subject to fewer outside distractions and pressures (especially if your computer is away from the TV set and the baby's asleep), are by yourself in a private setting, and are relaxed and "in touch with yourself" (to use a California expression). Theoretically, you think more clearly than you can at the office.

**Home Cons:** You usually have a more limited time frame (two to four hours), may be tired from commuting and a day's work, probably want to participate in family activities, and—unless you are among the 25 percent of FAMILY COMPUTING readers who own more than one computer—may face competition for the keyboard from spouse and children. You may also have noisy children or no good office space.





# HOW DOES YOUR JOB SCORE?

FILL OUT OUR HOME WORK ANALYSIS CHART

Filling out this chart makes a perfect project for an electronic spreadsheet.

Almost every office job involves one or more tasks that can be performed effectively on a computer at home. To help you analyze which tasks are best suited for home computerization, customize this chart with your own tasks and descriptions.

Basically, the chart should help you focus on what kind of information you need for a given task; what you will do with it; and how, where, and when you will present it.

Across the top of the chart, list all the tasks you can think of in your job. Be specific; if the tasks are too general, they will seem very time-consuming and the interest level will be difficult to categorize. For instance, instead of saying "Write lots of memos," divide it into specific tasks: "Weekly performance reports," "Monthly sales reports," etc. Likely, each is prepared differently and is more, or less, interesting to you.

For each category, choose the number that best fits your task. The chart has been constructed so that a final score of 50 denotes a task that you're probably better off doing at the office. A score of 10 denotes one that can easily be done at home, totally independent of the office. Scores in between reflect the degree of independence from the office; the higher the number, the more you need to be at the office.

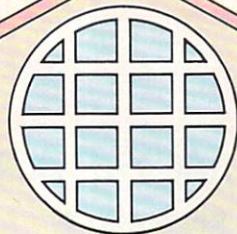
In designing this chart, I've slanted the questions so that they relate more to after-hours work than to full-time work at home. Thus, don't take your score too literally; use it only as a guide to help analyze your own situation and goals. For example, the deadline for your task could radically change your interpretation of your final score, even if the score is very low.

An eight-hour task due tomorrow is a far cry from one due next month. Many tasks that you ordinarily can do at home require an office if you have to make five copies and send them out by Express Mail that night.

	A	B	C	D	E	F
<b>A</b>						
<b>B</b>						
<b>C</b>						
<b>D</b>						
<b>E</b>						
<b>F</b>						
<b>TASKS</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
<b>1. TIME REQUIRED TO COMPLETE? *</b> 5—8 hours plus. 4—6 to 8 hours. 3—3 to 5 hours. 2—Fewer than 3 hours. 1—Requires little of my time, but much use of computer.						
<b>2. DEADLINE?</b> 5—Must be distributed immediately. 4—Less than one day. 3—2 to 15 days. 2—16 days or more. 1—No scheduled completion date.						
<b>3. INFORMATION SOURCE?</b> 5—Bulky printout, confidential hard copy that may not be removed, or direct-access mainframe. 4—Several hard-copy reports or verbal information obtained from several people. 3—Large time-sharing files, or is subject to update. 2—Easily transportable or available via time-sharing or modem. 1—Compatible disk or no data needed.						
<b>4. DEAL WITH OTHER EMPLOYEES?</b> 5—Need to consult in person frequently with other employees. 4—Spend more than half of the projected time to complete task in scheduled meetings. 3—Must be available on office telephone and/or be easily reached during business hours. 2—Spend less than half the projected time to complete task in scheduled meetings. 1—Rarely need to consult with, or be available to, other employees; occasional phone calls suffice.						
<b>5. NEED OFFICE EQUIPMENT?</b> 5—Require mainframe computer and/or other large office equipment frequently (such as word processor). 4—Data files require large-capacity storage. 3—Need facsimile or copy machine, dictating machine, or secretary. 2—Require PC peripherals for final production that are too expensive to buy and/or too bulky to take home. 1—No special equipment required.						
<b>6. PRIORITY OF TASK?</b> 5—Top priority job; begin as soon as data is available. 4—Important task suspended only for emergency situations. 3—Important, but minor delays or interruptions acceptable with advance notification. 2—A slack-time task; not critical to job. 1—Low priority, can never find time—but it might help me understand or control my job better.						
<b>7. NEED/WANT HELP? ENJOY TASK?</b> 5—Requires special assistance/expert help. 4—Don't like task; want to give it away. 3—Task would benefit from consultation. 2—Enjoy doing myself, but frequently don't have time. 1—Love task, wouldn't let anyone else touch it.						
<b>8. DIFFICULTY OF TASK?</b> 5—Simple job done frequently. 4—Well-defined task done several times a week. 3—Job requires referring to text or manual when doing. 2—Tough or unique job that requires attention. 1—Job requires learning process or requires difficult new software.						
<b>9. COMPUTER REQUIREMENTS? **</b> 5—Office PC hooked directly to mainframe or equipped specially to do this job. 4—Radical expansion (costing more than \$500) of present home system. 3—Best software for job not available for my computer at home. 2—Office printer for final production; can send data from home to office system via modem. 1—Any computer.						
<b>10. ENERGY REQUIRED?</b> 5—All my faculties must be in tip-top shape. 4—I always review output after a night's rest. 3—I try to get to this before 3 p.m. 2—I can do task anytime. 1—I find job a refreshing change of pace.						
<b>TOTAL</b>						

\*Consider both question 1 and question 2 before answering. Score higher for tasks you think are more office-dependent.  
\*\*If you don't already use a computer, score 3.





automated. He makes decisions on accurate information, sees trends developing as they happen, and knows his schedule at a glance. All this is of key importance to a sales executive whose fast decisions can have a huge impact on profits.

### **CORPORATE CULTURE**

How much latitude and encouragement you will get as you begin to explore using your home system for business purposes depends on the philosophy of the company and the attitude of your boss toward you and your job performance. Frankly, you'll probably never hear an objection to using your own equipment to do extra work, nor is it likely that you would be refused weekend or evening use of company software and other resources.

But having a computer at home and using it to do business also opens up the possibility of simply working at home. Elaine, for in-

stance, frequently schedules one or two mornings a week at home, when she drafts memos and projects in the peace and quiet of her home office. But Mark, who needs to be available to consult with other employees and frequently needs access to corporate records during the day, must be in the office during normal hours.

One progressive firm, in which several key executives and managers have home systems, has seriously investigated installing a "bad-weather network"—with modems and communications software—to enable people to work out of their homes during the winter. The reasoning? It makes more sense to encourage people to work at home on snowy days (or during minor illnesses) than to expose them to the hazards of driving on bad roads or have them stay home without working. Another firm routinely supplies portable equipment to professional staff, thus enabling them to work at home or on the road.

Full-time employees working at home regularly is a new idea, however, and is likely to meet a lot of resistance in most companies. As experience with the concept grows, so will acceptance and practice.

## **WORK AT HOME: TIPS ON GETTING STARTED**

**1.** Fill in the Home-Work chart. Identify between one and three tasks that would benefit from computerization and that appeal to you as evening projects. Don't worry if you don't have the computer equipment or skills to begin immediately. Remember that learning is a key home task—something that can be done more effectively out of the hectic office atmosphere.

**2.** Now that you have a short list of projects, begin one of them. Take time to think out your needs; enjoy the project as you would a Saturday morning hobby or an odd job. If you're not sure how to computerize a given task, take your chart to a computer dealer or a computer-using friend, describe your problem, and get some advice. Also, read FAMILY COMPUTING's Working At Home and Telecomputing departments, which are often filled with ideas for productivity.

**3.** As you become more proficient and your project occupies less time, start the next one. Stop when it begins interfering with your family—the object is not to make computer widows, widowers, and orphans of your loved ones. You'll soon find your and your family's own tolerance level (two or three evenings a week has been a good average for me).

**4.** As you—and your boss—become aware of how productive your home system can be, think about experimenting with daytime work at home, if that's attractive to you. Start small, maybe with Tuesday mornings. If the results are good, expand the experiment. If not, analyze what went wrong and whether or not the obstacle can be overcome. Many jobs simply must be done at the office. If yours is one of those, accept the inevitable.

### **BEST WORK FOR HOME**

My analysis of others' situations and my own experience with using computers at the office and home (for a good five years), have shown that the ideal task is one that: **1.** Requires a short time to produce or has no specific deadline and can be completed in several short sessions; **2.** Involves learning and/or an uninterrupted stretch of time for complete concentration; **3.** Doesn't depend heavily on office resources; and **4.** Carries a high degree of personal interest.

Examples of such tasks include drafting memos and reports, learning new computer and job skills, developing new idea proposals, analyzing and graphing trends and problems, developing forecasts, and organizing project schedules and work flow.

These are the kinds of tasks that always seem to get pushed aside at the office, yet can enhance your personal productivity enormously without impinging on your personal life. These tasks can fit into your schedule, produce real results, and are an enjoyable way to spend an evening because they interest you and/or reduce nagging pressures in your everyday life. ☐

**THE BEST TASKS  
TO DO AT HOME  
ARE THOSE THAT  
ALWAYS GET  
PUSHED ASIDE  
AT THE OFFICE.**





# FRANKLIN ACE 2200

## A COMPUTER THAT RUNS MOST APPLE II SOFTWARE

BY HENRY F. BEECHHOLD

The Franklin Computer Corp. built its initial reputation on reasonably priced, Apple-compatible computers. Then it was sued by Apple for infringing on Apple's copyrighted operating system—and lost. Now, after a long and costly day in court and a flirtation with bankruptcy, a reorganized Franklin is back—with another computer that runs Apple software.

The Franklin ACE computers are well-made, and emulate Apple's BASIC and operating system without copying them. By so doing, the ACE computers run a vast number of programs originally written for the Apple II plus, IIe, and IIc. For someone in search of a legal Apple-compatible computer, Franklin's it.

### HOW COMPATIBLE?

According to Franklin, the Franklin 2000 series currently will run all but 40 programs that work on the Apple II series. Among the "no gos" are *Better Working File & Report*, *Cut & Paste*, *Home Accountant*, *Math Blaster*, *Millionaire*, *Snooper Troops*, *Speed Reader*, *Spell It*, *Word Juggler*, and *Word Attack*.

Franklin hopes that the list of com-

patible programs will grow as software houses make code changes to let their software run on the Franklin. United Software has already done this with *ASCII Express*, a communications program. At least five programs, however, will probably never make it: *Apple Writer II*, *BPI Business Series*, *Dinosaur Dig*, *F-15 Strike Eagle*, and *Hard Hat Mack*.

To test compatibility over a wide range of software, I ran *Flight Simulator II*, *AppleWorks*, *HomeWord*, *Gelfling Adventure*, *The Graphics Magician*, and *FlashCalc*. All the programs performed exactly as they do on Apples. Well, that's not entirely true. Disk accesses on the Franklin are several times faster than on the Apple, a big advantage for any software that makes heavy use of the disk.

What is unclear right now is whether the flood of new software for the Apple IIe computers that use a 3.5-inch disk drive and/or the new Apple Memory Expansion unit, will run on the Franklin 2000 series. John Applegate, Franklin's product specialist, says that the company is testing new software, such as the revised *PFS* series, with the as-yet unreleased Franklin memory expansion card, and will continue to update its list of compatible programs.

### HARDWARE

The Franklin comes in three models: the ACE 2000 (\$699), ACE 2100 (\$849), the ACE 2200 (\$999). The only difference is the number of disk drives—zero, one, or two. We tested the ACE 2200, which is the one most Franklin dealers stock.

All units have a built-in fan, 40-/80-column screen capability, 128K of user memory (RAM), a Centronics (parallel) printer port, nine-pin and 16-pin joystick ports, and two open internal expansion slots, as well as an external expansion-box connector. The popular Apple SuperSerial card works in one of the open slots to connect a modem or some printers, and the Apple mouse also works.

Because it comes with a printer port, 80-column screen display, and disk-drive interfaces, the Franklin 2000 has only two open slots. In this regard, the ACE 2000 is a cross between the Apple IIc—which has all interfaces built in and no open slots for expansion—and the II plus and IIe—which are bare-bones models in their native states, but have seven open slots for expansion boards.

**Monitor.** A video display is not included with the system. While Franklin does sell an inexpensive (\$139) monochrome monitor (the one we

HENRY BEECHHOLD wrote the six-part "Hands On" series now appearing in FAMILY COMPUTING.



### FRANKLIN ACE FACTS

**SYSTEM:** Three models (all include CPU, detachable keyboard, and Franklin DOS 2)—Franklin Ace 2000, no disk drive (\$699); ACE 2100, one disk drive (\$849); ACE 2200, two disk drives (\$999).

**WARRANTY:** 90-day; over-the-counter replacement from dealer for any defect.

**MEMORY:** 128K RAM; expandable to 1 Megabyte.

**VIDEO DISPLAY:** 40- and 80-columns; monochrome or color (16 colors); RGB interface optional.

**INTERFACES:** Parallel printer; two joystick/mouse connectors; two open expansion slots for circuit cards; slot for external expansion box.

**SPECIAL FEATURES:** Runs most Apple II software; 12 function keys; can print out anything on-screen at any time ("screen dump"); Franklin character set; numeric keypad; cooling fan and 67-watt power supply.



used wasn't very sharp), any standard color or monochrome monitor will work.

Because no RF modulator is provided, you can't hook up a TV set to the Franklin. But eventually you'll be able to use an RGB (Red-Green-Blue) color monitor when Franklin releases the required interface.

**Disk Drives.** The disk drives are solid, and their lever closures work smoothly. Franklin claims the drives read disks seven to 10 times faster than Apple drives. While those actual numbers couldn't be proved, there's no question that Franklin drives whisk data into memory considerably faster than do standard Apple drives.

The Franklin disk drives store the same amount as Apple drives—about 140K after formatting. Thus, the two drives in the Ace 2200 store less than one double-sided, double-density drive on the IBM PC or compatible computers.

**Cooling Fan.** While we can applaud the Franklin's built-in fan (the Apple comes without one), there's nothing reticent about it. A tinkerer might be tempted to replace it with one that's a bit less assertive. It truly isn't necessary to turn the inside of the computer into a wind tunnel in order to achieve adequate cooling.

However, the fan, along with a sizeable power supply, mean that the Franklin is ready to handle a hard disk drive. Franklin's Applegate says The Sider hard disk drive (\$695, First Class Peripherals) has been tested and runs on the Franklin.

**Sound.** Audio in the Franklin is the same as in the Apple—just a plain old beep-maker. One convenience is the rear-panel-mounted volume control. However, two plug-in circuit boards that add good sound and music to the Apple IIe don't always work on the Franklin: the Echo Plus (Street Electronics), and the Mock-inboard (Sweet Micro).

## KEYBOARD

The black metallic keyboard has a serious, "professional" look, and was clearly made to handle abuse. The coiled connecting cable, fitted with a radio-frequency filter (as is the monitor cable), is rugged and should be able to bear kids' pulling.

The keyboard feel, unfortunately, is rather mushy. It's not a disaster, mind you, but it lacks the crisp touch that seasoned keyboardists like. Hunt-and-peck typists probably won't care a fig about this.

In place of the special-function "Open Apple" and "Closed Apple" keys, the Franklin provides "Open F"

and "Closed F." A full numeric keypad (another feature missing on Apple computers) is handy for inputting numbers. Cursor keys are on the keypad, and are arranged in a diamond or "compass rose." Also on the keypad are line-editing keys for BASIC, and LIST and RUN keys.

**Function Keys.** Twelve function keys are set along the top of the keyboard, just above the top line of regular keys. Apple computers, of course, are notorious for their lack of function keys, which generally make software easier to use.

Franklin is trying to convince some software developers to rewrite existing programs to take advantage of these function keys. Spectrum Holobyte has already done it for *Gato*.

**Franklin DOS 2.** If you start up your system with the Franklin DOS 2 disk, the function and editing keys perform a variety of screen- and disk-related functions. By pushing just one key, you can clear the screen or delete, rename, and copy files, etc. You can also program these function keys to do other tasks.

Booting an Apple disk directly, however, will leave all but the Apple-equivalent keys undefined. An Apple program disk will, in most cases, boot right up without your having to use the Franklin DOS 2 disk at all.

## LOOK AND FEEL

The Franklin ACE has a solid, business-like look—more similar to an IBM PC than an Apple. On the front panel, there are status lights for POWER, CPU, DBL HI RES (double high-resolution), DIAGNOSTICS and DISK ERROR. In addition to this colorful array, each disk drive sports two lights—a red one for any kind of activity, and a green one for writing. Thus, when the drive is saving something to disk, both of its lights are twinkling. So much flickering!

The video image is rock-solid and sharp. The double high-resolution graphics (560 × 192 dots, which both the Apple IIc and enhanced Apple IIe have) produces a most impressive picture. Though not that much software operates in DBL HI RES, it's shown off to great advantage with *The Graphics Magician* software.

The Franklin can produce up to 16 colors. In addition to the standard characters, there's an alternate character set of 32 figures, including the Franklin OPEN-F and CLOSED-F, up and down arrows, check marks (normal and inverse), and the like.

**"Screen Dumps."** Also, you can print out anything that appears on your screen at any time by pushing


CONTROL-I—even if the software has no print function. (This function is somewhat similar to the PRTSC key on the IBM PC.) While you must exit or "crash" the program you are running to use this "screen dump" capability, it's a potentially useful feature to prove you reached a certain score in a game, or to show off a beautiful graphic. To get the same capability on the Apple, you'd have to buy a separate program or a plug-in board.

**Documentation.** The User Reference Manual is a sketchy effort in a slick-looking, three-ring binder. It tells you enough to get your computer running—and very little more. Though we tested a production unit, the BASIC manual wasn't yet available. If and when it is, let's hope Franklin does better with it than with the computer manual. Manufacturers ought to try seeing their documentation from the user's viewpoint!

## QUESTIONS! ANSWERS?

Franklin's competition is not with a hole-in-the-wall company—it's with Apple. Not only are Apple II's still among the best-selling computers on the market, but Apple dealers are putting together packages close enough to the Franklin (in both capability and price) to keep Apple fans from switching allegiance. For instance, some dealers sell an Apple IIc with a built-in disk drive and a color monitor for \$999. The Franklin 2200 gives you two drives for \$999, but no monitor—kind of a toss-up. Franklin might do well to rethink its pricing and packaging.

So why would anyone buy a Franklin instead of an Apple? For heavy spreadsheet users, or for anyone who deals with numbers frequently, the numeric keypad might be a plus. For BASIC programmers who are experienced (there's no documentation for novices!), the Franklin 2000 series offers a few bells and whistles that Apple doesn't. On the other hand, if BASIC is your bag, you can find better machines than either the Apple or Franklin.

Given that the Franklin computers don't run all Apple software, and that the company's long-term prospects are questionable, it seems that Franklin should offer a few more enticements to differentiate itself from Apple. If the ACE computer came with built-in RGB interface and 512K memory, or a built-in serial port (or modem!), it would be a lot more alluring. As it is, the Franklin ACE is a smart-looking machine that works, and works well—but it lacks a certain power of persuasion. 



# BUYER'S GUIDE TO GRAPHICS SOFTWARE FOR EVERY PALETTE

BY ABIGAIL REIFSNYDER

With the increasing power of the visual media (especially television), a picture is worth more words than ever. Whether you're putting together a business presentation, making a birthday card for a friend, or simply looking for a new form of self-expression, computer graphics software can help you create your own exciting visual images. Graphics software has become easier to use—computer savvy is no longer a requirement. And the programs have become more powerful, offering a long list of features and functions.

"Graphics" is actually a kind of catchall label for four general categories of software: drawing, animation, business-graphing, and what can be termed "printing-press" programs. But there is overlap among these categories, particularly with the higher quality programs. For example, many drawing programs have print-out capabilities; several business-graphing packages include freehand drawing features.

Why would you want a graphics program and, if you decide you do, how do you pick one? An artist once said to me, "People who can't draw, draw on computers." Drawing programs give you tools that let you do things you might find difficult with pencil and paper. After all, how many people can draw a respectable circle without a compass? Drawing and coloring in shapes takes only a few seconds on a computer. If you like a shape you drew, you can copy it and paste it again and again all over your picture (forests are a snap: draw one tree, then copy it). And, if you don't like that last addition you made to your picture, just "undo" it without affecting the rest of your piece. In short, drawing programs do for drawing what word processors do for writing. Clip art—pictures and shapes included in many programs or added from another disk—can provide a comfortable starting point for your creations. Pull in a picture of a man, say, then modify him according to your whim: give him a mustache, make the nose longer, change his clothes, whatever.

But graphics programs aren't only for the artistically inept. Just as a professional writer finds word processors at least as useful as a casual writer does, artists can find a variety of uses for the new tools graphics software puts at their fingertips. Many artists do studies of a subject before sitting down with their oils; the computer can be a

good place for this preliminary sketching. Alternatively, the computer with graphics software can be considered its own medium, just as oils and clay are.

A lot of graphics software is difficult to use and/or below average in quality. Whenever possible, try to get a demonstration of a program, or, at least, page through the manual. As you look over our charts of programs, think of what you know you want to do, as well as how many extras you're willing to pay for. Use our charts as a guide: new programs appear weekly, so you're bound to come across programs we haven't included. There are also some we chose not to include because they were either too expensive, too difficult to use, or did not have enough features.

A number of other, specialized graphics programs don't fall into any of the four main categories. Clip art and font software are among them.

## DRAWING PROGRAMS

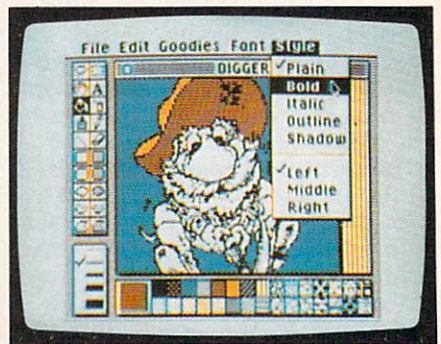
Most drawing programs include a wide assortment of drawing tools (such as paintbrush widths, solid colors, or color patterns). In addition, they include features to help you automatically draw circles, squares, and straight lines. You can fill in areas with colors; zoom in close up for pixel-by-pixel editing; and flip parts of your drawing upside down and sideways.

The key differences among drawing programs lie in the combination of features included—one may lack a basic feature or two but have other special "extras," such as the ability to merge two pictures together. Some programs are command driven, that is, you use one- or two-letter commands to draw freehand, make a circle, and so on. Most, however, use icon-oriented interfaces—in other words, you select small pictures (icons) of pens, brushes, circles, etc., from a menu to indicate what you want to do. Frequently, icons are used in conjunction with pull-down (or pop-up) menus that have additional options (an extra palette of brush shapes, for example, or font styles).

## ANIMATION PROGRAMS

While there are relatively few animation programs, they add an exciting dimension to graphics. Animation is a more complicated process than drawing, so it's not surprising that these programs are much harder to use. The key is frame-by-frame construction: You create the first frame, or picture, then alter it for the second frame, and

ABIGAIL REIFSNYDER specializes in writing about computers and video. Her articles have appeared in Video Review and Amiga World, among others.



Drawing programs, such as Dazzle Draw (left), TelePaint (middle), and CoCo Max (right), display menu options on-screen.



# DRAWING PROGRAMS

PROGRAM	EQUIPMENT	FEATURES	DOCUMENTATION	COMMENTS
<b>Blazing Paddles*</b> \$35 (C 64/128) \$50 (Apple) Baudville (616) 957-3036	Apple, C 64/128 Inputs: mouse, pad, joystick, light pen Hard copy: B&W	Comes with shape library. Missing: flip, invert (except with shapes). Erase only as brush in background color.	Manual goes through each feature in depth; even warns of potential problems. Does not tell all, but misses nothing significant.	Straightforward, no-frills package that lacks some fun features. Text use is awkward, since you can add only one line at a time. Particularly good for kids.
<b>CoCo Max</b> \$70 Colorware (718) 647-2864	64K Tandy CoCo Inputs: KoalaPad, joystick, mouse Hard copy: B&W	Extras: fonts, pattern-editing, wide assortment of brush shapes. Can draw boxes in any brush width.	Clear and to the point. You'll need it for setting up and printing out, but otherwise, only as a reference.	An outstanding program that almost turns your CoCo into a replica of the Macintosh. Terrific hires color, very easy to learn and use. Has icon-based menu. Comes with plug-in module requiring Multi-Pak and Y cable.
<b>The Complete Graphics System</b> \$80 Penguin Software (312) 232-1984	Apple Inputs: keyboard, joystick, trak ball, pad, mouse Hard copy: B&W	Extras: arcs, ellipses, triangles, rotate function. Missing: erase, clear screen, invert, mirrors.	Difficult manual. Lists all commands in what appears to be no particular order. Too much to read and retain.	A powerful program that will appeal to those who like to get inside the computer. Too inflexible and complicated for kids or casual artists.
<b>Dazzle Draw</b> \$60 Broderbund (415) 479-1170	128K Apple IIe/IIc Inputs: mouse, pad, joystick Hard copy: B&W, color	Extras: does rays, modifies patterns, offers slide show option. Erase only as brush in background color.	Very clear and easy to read. Not necessary to get started, but worth reading eventually, or you'll miss less obvious features.	Responds well to input, has good fill function. Flexibility of input devices makes this easy for all ages to learn and use. Uses pull-down menus. Current tool displayed at bottom of screen. Colors are good.
<b>Deluxe Paint</b> \$80 Electronic Arts (415) 571-7171	Amiga Inputs: mouse Hard copy: B&W, color	Many extras, including smear, shade, blend, cycle colors.	Clear, and worth reading eventually, or you'll miss or misunderstand some features.	Easy to use, and packed with fun features you wouldn't expect on a computer. Most menu commands can be executed from keyboard.
<b>Doodle</b> \$40 Omni Unlimited (818) 795-6664	C 64/128 Inputs: joystick, trak ball Hard copy: B&W, color	Op-art feature detects and redraws edges of shapes to create maze look. No spray or undo.	Manual doesn't look like much, but it's to the point and easy to read.	Surprisingly easy for a program that combines keyboard and trak ball input. Doesn't overlay color well.
<b>IBM Drawing Assistant</b> \$169 IBM (305) 998-6107	IBM PC/PCjr with 256K Inputs: keyboard, mouse, joystick (PCjr) Hard copy: B&W, color	Extras: scroll, can merge two pictures together. Comes with clip-art disk.	Very easy to read. Tutorial is only worth doing if you've never used a drawing program before. Especially good instructions on setup.	Has good feature mix. Can be used with all IBM Assistant-series programs. Requires mouse or joystick for good freehand drawing.
<b>KoalaPainter and KoalaPad</b> \$99 (C 64/128) \$125 (Apple, PCjr); \$150 (IBM) Koala Technologies (800) KOA-BEAR	Apple, C 64/128, IBM PC/PCjr Inputs: pad Hard copy: B&W, color	Missing: text, flip, cut & paste, invert, undo for filled shapes. Awkward spray. Erase only as brush in background color. Does rays.	Simple and easy to read—you probably won't have to, though.	Easy to learn, but missing some nice features. Good shapes are fun for kids to work with. Doesn't overlay color well, which may cause distortion in your picture.
<b>MacDraw</b> \$195 Apple Computer (408) 996-1010	Macintosh Inputs: keyboard, mouse Hard copy: B&W	Missing: zoom, mirrors, and spray. Has smoothing function, ability to enlarge, reduce, scroll, and group pieces.	Easy to read. You'll probably need it for more complex functions.	Much more flexible than <i>MacPaint</i> , and is especially good for diagrams, page layout, and scale drawing. Good for creating your own stationery and card designs.
<b>MicroIllustrator</b> \$35; \$50 w/pen TechSketch (800) 526-2514	Apple, Atari, C 64/128 Inputs: light pen Hard copy: B&W	Missing: cut & paste, erase, flip, invert. Does rays.	Short and painless to read. Straightforward explanations of features.	Easy to use, especially because light pen has select button for easier handling. Doesn't overlay color well at all.
<b>MousePaint and Apple Mouse</b> \$149 (IIe); \$99 (IIc) Apple Computer (408) 996-1010	64K Apple Inputs: mouse Hard copy: B&W, color	Missing: fill function. Extra shapes, empty and filled. Can't draw with patterns.	Well-written manual. Clear and well organized.	Easy to use, but lack of fill function is serious drawback. Colors are difficult to control on composite monitor.
<b>PC Paintbrush</b> \$139 MSI (415) 454-7107	192K IBM PC, 256K PCjr Inputs: mouse, pad, joystick, digitizer Hard copy: B&W, color	Missing: flip and invert. Can modify patterns, scroll, combine screens, modify brushes, and erase color.	Some of the icons in the manual don't correspond to those on-screen. Otherwise, straightforward and well organized.	Easy-to-use, Mac-like interface. Very slow when using big brushes, but has some fun features. Can capture pictures from other programs.
<b>PenDesigner and Gibson Light Pen</b> \$250 Koala Technologies (800) KOA-BEAR	Apple Inputs: light pen** Hard copy: B&W, color	Missing: flip, invert, undo, erase, and cut & paste.	Clear and to the point. A must-read to get the most out of the program.	Easy to use—one hand operates pen, while the other presses space bar (the only key you have to press). Some good features are missing, though.
<b>Rainbow Painter</b> \$35 Springboard (612) 944-3915	Apple, C 64/128 Inputs: joystick, keyboard, pad Hard copy: no	Missing: text, cut & paste, erase, clear screen, flip, invert, spray.	Clear and simple—doesn't tell you anything you don't have to know.	Missing some good features, but fill is really fast. Doesn't warn you when you are about to permanently erase your picture.
<b>TelePaint</b> \$149 LCS/Telegraphics (617) 547-3748	256K IBM PC Inputs: mouse Hard copy: B&W, color	Extras: color swapper, stamp, rotate, scroll, paint modes. Can modify patterns and capture pictures from other programs.	Very clear and easy to read, but you'll probably refer to it only for setting up initially and creating your own patterns.	A terrific program—really easy, really fast. Everything is on the screen all the time with a help screen to explain everything. Only odd thing is text: moves wherever the mouse goes.

\*When packaged with *Animation Station* from Suncom, (\$75 Commodore, \$85 Apple), this is called *DesignLab*.

\*\*You may have some trouble installing the light pen if you have one of the earliest models of Apple IIe. Package includes *PenPainter* software as well.

**Key:** Unless otherwise noted, the programs listed are on disk. Minimum memory requirements: 48K Apple II series, 48K Atari, C 64/128, 128K IBM PC/PCjr, and 128K Macintosh. All drawing programs include the following basic features: freehand drawing, different brush widths, fill, spray (drawing with dots), circles, boxes, lines, text entry, zoom (magnification of selected section for pixel-by-pixel editing), undo (automatic erasure of most recent addition), colors/patterns, cut/paste/copy, erase (clearing one section of picture), clear screen, flip (horizontal, vertical), invert (background to foreground color or vice versa), mirror-imaging.



# "PRINTING PRESS" PROGRAMS

PROGRAM	EQUIPMENT	FEATURES	DOCUMENTATION	COMMENTS
<b>Fontrix</b> \$95 (Apple) \$125 (IBM) Data Transforms (303) 832-1501	Apple, 256K IBM PC/ PCjr w/graphics adapter Inputs: keyboard, joy- stick, pad, paddles Hard copy: B&W, color	Comes with 11 fonts, plus font editor to make your own. Over- lay and transparency. Sizing, cropping, and sideways print options.	A must-read to work with pro- gram. Well-organized and com- plete, good diagrams. Small tu- torial is worth doing.	Excellent program and easy to use with some unusual capabili- ties, such as scrolling from screen to screen and combining screens for printing a page. Hi- res page detail. Extra font/pic- ture disks available (see review in <i>What's in Store</i> ).
<b>MacPublisher</b> \$100 Boston Software Publishers (617) 267-4747	Macintosh Inputs: mouse Hard copy: B&W	Does page makeup, table of contents. Can't box text, or put lines between columns.	Must read, but skip Chapter 1. Otherwise, read entire manual before using program. Quite confusing documentation.	Full-fledged electronic-publishing package good for newsletters. Difficult to learn; more for seri- ous users. Can use text and art in <i>MacPaint</i> format.
<b>Mask Parade</b> \$40 Springboard (612) 944-3915	Apple, PC/PCjr Inputs: keyboard, joy- stick Hard copy: B&W	For children 4-12 to make masks, badges, etc. Comes with clip art of mask outlines, eyes, noses, mouths, etc. Some drawing capabilities.	Manual is written for parents to read, not kids. Clearly writ- ten, though.	Easy to use, and gives kids op- tion of drawing from scratch or using supplied shapes. Assump- tion is that they will color-in printed results.
<b>Newsroom</b> \$60 (Apple, IBM) \$50 (C 64/128) Springboard (612) 944-3915	64K Apple, C 64/128, IBM PC Inputs: joystick, pad, keyboard, mouse (Apple) Hard copy: B&W	Comes with clip art. Text and drawing capabilities.	Straightforward, but dry man- ual. You only have to read first half; second half is about news- paper work. Use the program as you read manual.	Formats make front page of newspaper; this is much harder to use than it looks. You must follow steps precisely. Doesn't warn you if you are about to do the wrong thing. Kids will need help.
<b>Prince</b> \$70 Baudville (616) 957-3036	64K Apple Inputs: keyboard Hard copy: B&W, color	Text, crop, scroll functions. Works with <i>Blazing Paddles</i> , <i>Dazzle Draw</i> , <i>Microillustrator</i> , <i>Pixit</i> . Comes with paper, enve- lopes, stickers, test cloth.	Clearly written with lots of dia- grams. Detailed description of changing ribbons. Do the "Let's Print" tutorial.	Makes color prints with B&W printers. Does color separating. A terrific program that's really easy to use. Lets you do a lot of things with all those pictures you draw—not just for kids.
<b>The Print Shop</b> \$50 (Apple) \$60 (IBM) \$45 (C 64, Atari) Broderbund (415) 479-1170	Apple, Atari, C 64/128, IBM PC/PCjr Inputs: keyboard, joy- stick, pad Hard copy: B&W	Limited drawing capabilities. Can do sizing, cropping. Comes with colored paper and envelopes.	Clear, readable manual with detailed descriptions of each activity. You probably won't have to read manual, though.	Makes cards, signs, and station- ery. Works with most printers. Utility disk, <i>Print Shop Compan- ion</i> , available with fonts, bor- ders, and other graphics tools. Clip art disks available.
<b>ReadySetGo 2.0</b> \$125 Manhattan Graph- ics Corp. (212) 989-6442	512K Macintosh Inputs: mouse Hard copy: B&W	Does page make-up. Picture- and text-sizing, plus cropping and scrolling.	Well-written manual, worth reading to get the most out of the program, but use more for reference. Useful tutorial.	Easy to use and flexible program. Particularly good for newsletters. Can use text and art in <i>Mac- Paint</i> format.

in your printer. The edit function lets you crop pictures, add text, and scroll across different screens to get an overview of your layout. *Prince* expands your capabilities by enabling you to actually make things—stickers, iron-on transfers for T-shirts, or color printouts—with the pictures you draw.

Obviously, the computer itself is a limiting factor in how powerful a graphics program can be. Nevertheless, many programs for the IBM PC don't seem to take advantage of the computer. *TelePaint*, by contrast, combines power and ease of use. Absolutely every tool is on the screen, and if you forget what anything does, simply click the mouse for the help screen which describes each icon. *TelePaint* has a wide variety of extra features including a color-swapper, which lets you choose to replace one color with another in your drawing.

In the animation category, nothing compared in ease of use and power with *VideoWorks*. *VideoWorks* doesn't pretend that animation is easy, but it makes up for the complexity with an interface that is easy to use and provides good access to all the capabilities of the program. Visual representations of each frame of each video track help you understand what activities are happening simultaneously, while, at the same time, letting you alter little pieces of the frame without a lot of trouble. The three tutorials are fun and informative.

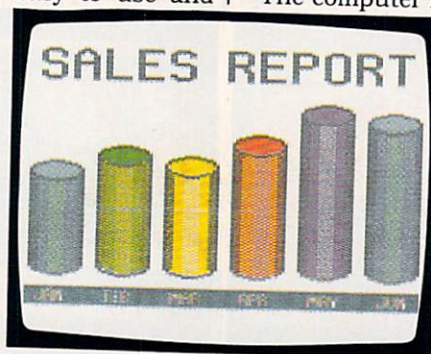
For those who dream of a program that will turn numbers miraculously into business charts without compromising on freehand drawing options, *PC Illustrator* is for you. This wonder-

fully diverse program has an icon-based menu that makes it easy enough even for young children to use. Further enhancing its flexibility is the fact that it works with every imaginable input device: mouse, joystick, light pen, touch pad, even a digitizer. It packs power as a business package, yet, has all the basic elements of a drawing program. Particularly fun to use is the font feature, which allows for outlining and placing text on the diagonal.

For C 64/128 and Apple owners, one of the best deals on the market is *The Animation Station* (Suncom), a touch tablet bundled with *Blazing Paddles* (called *DesignLab* in this package). The tablet responds quickly to the pressure of the stylus, and has a grid on its surface for more accurate drawing. The software is solid and easy to use. The menu is icon-based, and there is a shape library of animals, trees, and more to get you started.

## THE ARTIST IN US ALL

The computer has added a new dimension to graphics



*Prince* offers the option of color printouts.

creativity. Never before has it been possible to draw in patterned (rather than solid) colors, or to instantly erase the background color while leaving the rest of the picture intact. Yet, for all the new options, the computer is a forgiving canvas. It lets you erase mistakes, and even to start over again from scratch. Graphics software brings the diversity of an art studio into your home. And with all those colors, patterns, and shapes at your fingertips, you may discover artistic resources you never knew you had. ☐



# COLOR PRINTERS

BY ROGER HART

Your computer can create an infinite variety of graphic pictures and drawings. It's all done by running millions of numbers through the silicon chips inside your computer. These numbers are converted into dots to be imprinted onto the paper. And, on many computers, and with some software, these dots are assigned a color code. But this magic won't do you any good unless you have a color monitor or printer.

Keep in mind when considering a good color printer:

**1. Number of colors.** Color printers use only a few colors of ink—usually red, blue, and yellow—to achieve their rainbow printouts. Green, for example, is produced by printing in blue, then by making a second pass in yellow. Most color printers produce seven colors: red, blue, yellow, green, aqua, violet, and orange (the latter four by mixing the first three). With the proper software or by doing your own programming, some printers can produce more than 100 shades of color, though you may not find the effect that much more impressive than a seven-color printout.

**2. Software compatibility/interface.** If you have graphics programs, check to see which printers they work with; vice versa if you have a color printer and are looking for graphics programs. By the same token, make sure you can find the right cable to connect the color printer to your computer.

**3. Speed.** When printing color graphics (as opposed to black-and-white text), color printers are not fast. Because mixing a color can require three or more passes of the printhead, a full-color page can take 20 minutes to print out. If you're planning to print text primarily, then the speed (cps, or characters per second) is very important.

**4. Printer type.** There are three main kinds of color printers: impact dot-matrix, thermal-transfer, and ink-jet. When considering the pros and cons of each, a potential buyer should ask, "Will I use this printer primarily for text with occasional color, or will I use it primarily for color?"

IMPACT DOT-MATRIX printers have printheads with tiny wires that press against the ribbon to form an image on the paper underneath. The more wires (some printers have as many as 24), the less "dotty" (or sharper) the image. Color dot-matrix printers offer a choice of ribbons: black (for text) or three-color. (The Epson JX-80 has a four-color ribbon, which includes black.) Besides long-lasting ribbons, the main advantage to these printers is their high speed when printing text.

THERMAL-TRANSFER printers are also dot-matrix printers, but don't use impact mechanisms. Instead, the printhead wires are heated. The warmth softens ink on the ribbon, and the ink transfers to the paper. Plain paper or clear acetate transparencies can be used. Thermal-transfer color printers are less expensive than many popular dot-matrix printers, and text quality is adequate. Color ribbons (about \$7 each), however, are good for only about 10 pages.

INK-JET color printers form images by squirting ink at the paper. This sounds like a messy affair, but the droplets are highly controlled and the printed image is usually quite vivid and bright. The colors get slightly mixed and blended before they dry, so hues are natural and even. Ink is held in cartridges, which are easy to remove and replace. When printing text, ink-jet printers are relatively slow, but they are whisper quiet.

## A RAINBOW OF CHOICES

### Apple Scribe

MANUFACTURER: Apple; (408) 996-1010  
PRICE: \$299  
TYPE: Thermal-transfer  
TEXT SPEED: 80 cps  
INTERFACE: Apple serial (IIe/IIc)  
COMMENTS: Uses a black ribbon for text and a three-color ribbon for color. The 24-pin printhead produces very good "near letter-quality" text.

### Apple ImageWriter II

MANUFACTURER: Apple  
PRICE: \$595  
TYPE: Impact dot-matrix  
TEXT SPEED: 250 cps  
INTERFACE: Apple serial (cables for all Apple computers, \$29)  
COMMENTS: This new version of the ImageWriter is a big improvement—it's much faster and can use a black or three-color ribbon. It's also neat on a desk, with legs in back so you can hide paper underneath it.

### C. Itoh 8510

MANUFACTURER: C. Itoh; (213) 327-5939  
PRICE: \$649  
TYPE: Impact dot-matrix  
TEXT SPEED: 180 cps  
INTERFACE: Parallel; serial (\$699)  
COMMENTS: A color version of the popular ProWriter printer, the 8510 comes in an SCEP model compatible with an Epson or an SCP (or "Itoh") model. Uses a three-color or a black ribbon. Near letter-quality mode is 45 cps. The PC Itoh Utilities Package (\$55) from

C. Itoh Digital Products (800-384-1984) allows you to make screen dumps from any IBM PC or compatible.

### Epson JX-80

MANUFACTURER: Epson America, Inc.; (800) 421-5426  
PRICE: \$399  
TYPE: Impact dot-matrix  
TEXT SPEED: 160 cps  
INTERFACE: Parallel; serial (optional kit, \$102)  
COMMENTS: The JX-80 uses a four-color ribbon (three primary colors plus black), which makes it particularly useful for mixing color with standard text-printing. Because Epson printers are so widely used, this printer is supported by most color graphics software.

### IBM Color Jetprinter

MANUFACTURER: IBM; (305) 272-2662  
PRICE: \$745  
TYPE: Ink-jet  
TEXT SPEED: 50 cps  
INTERFACE: Parallel  
COMMENTS: The Jetprinter uses an easily replaceable four-color ink cartridge (includes black). The IBM Color Jetprinter is a good choice if you have an IBM PC and want to stay in the IBM camp, but you can find better prices on other equally good ink-jet printers.

### NEC Color Pinwriter P2

MANUFACTURER: NEC Information Systems; (800) 343-4418; (617) 264-8635  
PRICE: \$999—\$1,085

TYPE: Impact dot-matrix  
TEXT SPEED: 180 cps  
INTERFACE: Parallel (\$999); serial (\$1,085)  
COMMENTS: The speedy Pinwriter P2 can use any software that calls for the Epson JX-80. The Pinwriter prints out high-density text and bright colors. When used with Colomate software (\$125, for Macintosh), the Pinwriter will print color from the black-and-white Macintosh!

### Okimate 20

MANUFACTURER: Okidata; (800) OKIDATA; (609) 235-2600  
PRICE: \$258—\$268  
TYPE: Thermal-transfer  
TEXT SPEED: 80 cps  
INTERFACE: Plug 'n Print kits available for Amiga, Apple II, IBM PC/PCjr, and Macintosh  
COMMENTS: The Okimate 20 turns out sharp color and text. The Oki has a good near letter-quality mode at 40 cps. Advanced Color Screen Print Software (included) allows you to print anything that appears on your monitor. Cables are also included.

### Okimate 10

MANUFACTURER: Okidata  
PRICE: \$238  
TYPE: Thermal-transfer  
TEXT SPEED: 60 cps  
INTERFACE: Plug 'n Print kits available for Atari Home Computers, Commodore 64/128  
COMMENTS: The Oki 10 is much the same as the Oki 20, but is designed for the Atari and

Commodore computers—and is by far the best color printer choice for them. However, the Oki 10's text printing isn't as sharp as the Oki 20's.

### Quadjet Color Ink-Jet

MANUFACTURER: Quadram Corp.; (404) 923-6666  
PRICE: \$495  
TYPE: Ink-jet  
TEXT SPEED: 40 cps  
INTERFACE: Parallel; Apple II model bundled with PowerPad; IBM PC, with KeyChart; IBM PCjr, with Quadpaint  
COMMENTS: The Quadjet is a good value for the money. It does text-printing with a black ink cartridge; to change to color you simply snap out the black and snap in the three-color cartridge.

### Tandy Color Graphics Printer 220

MANUFACTURER: Tandy; (817) 390-3700  
PRICE: \$599  
TYPE: Ink-jet  
TEXT SPEED: 37 cps  
INTERFACE: Parallel; Tandy Color Computer serial  
COMMENTS: Uses a black or three-color ink cartridge. A disk included with the printer allows you to make color screen dumps from your Tandy CoCo or Tandy 2000.

### EDITOR'S NOTE:

The **Juki 5510** dot-matrix printer (\$499) with an optional color kit (\$149), was arriving in our offices as we went to press; look for details in next month's New Hardware. **FC**



# HANDS ON PATTERNS OF DATA COMMUNICATION

BY HENRY F. BEECHHOLD

Part Four of a Six-Part Series

*We need reasons to speak, but none for silence.* —Pierre Nicole  
*De la Paix les Hommes, II, 1*

That's all well and good for M. Nicole to say, but one thing's for certain: reasons or no, we *will* speak, and when we do, we *insist* that our message gets through. To ensure that the words (and other messages) we feed into our computers enjoy a successful trip around the system and into the outside world, clever people have devised methods for computers to communicate with people, with peripherals, and with each other. This month's "Hands On" explores the two general patterns of data movement (parallel and serial), and looks at some of their specific manifestations in the world of microcomputers.

## PARALLEL AND SERIAL DATA FLOW

In parallel communications, data moves along one *byte* (i.e., eight

bits, or one character) at a time, each bit traveling on its own wire, side by side with others. In serial communication, each byte is funneled, one *bit* at a time, into a single wire, Indian file. Think of eight columns of troops marching along abreast, as opposed to a single column marching in file. The first group will get across the field faster.

And so it is with electrons: potentially, parallel communication is indeed faster than serial communication. There are two principal disadvantages of parallel communications: 1. parallel cables require many conductors; and 2. parallel connections must be kept fairly short for best performance, partly because multiconductor cables are susceptible to electrical "noise" or interference. By comparison, serial communication can occur over as few as two lines, and serial cables can cover much more ground without endangering the "purity" of the data stream.

## SOME PARALLEL STANDARDS

**Centronics.** The big winner in the parallel-interfacing sweepstakes was Centronics, a printer manufacturer. This company's proprietary design has, in fact, become the microcomputer world's most commonly used type of parallel interface.

Although the Centronics "stan-

dard" has no official standing, most manufacturers follow it closely. If your computer has a "Centronics parallel port," and you buy a peripheral said to be Centronics-compatible, interfacing will usually amount to plugging in a standard cable.

**IEEE-488.** You may also hear about IEEE-488, another parallel standard developed by the Institute of Electrical and Electronic Engineers and approved by the American National Standards Institute (ANSI). IEEE-488 is used extensively for interfacing scientific instruments to computers, and was adopted on early Commodores (PETs) and many Hewlett-Packard micros.

## THE RS-232C SERIAL STANDARD

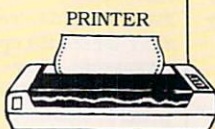
There is an official serial standard called EIA (Electronic Industries Association) RS-232C, which almost all manufacturers claim to follow, but which is implemented in so many different ways as to make serial interfacing a pain. Most RS-232C connections require only a subset of the 25 separate lines provided for in the standard (see diagram, below), and figuring out which are being used in any given interface (and how to hook them up) can be confusing. As a result, you usually can't connect two so-called RS-232C-compatible devices "straight up" and automatically

## PARTS OF A PROTOCOL

Data communications protocols are systems of electrical connections and/or procedures that let devices talk to one another without confusion. A protocol dictates how data is to be transmitted and what cues must be sent and received to control the process of transmission on both sides. Physically, a protocol defines the number and purpose of lines required for data transmission and the number and purpose of lines required to control communications. "Control" lines include those used for *handshaking* (a system for signalling whether a device is ready to send or receive data), plus lines for timing and other purposes. Just as important, a protocol also defines the electronic and logical format of message and control signals that traverse the interface.

### Centronics Interface for Epson Printers.

Line	Name	Purpose
1	Strobe	Timing of transmission
2-9	Data	8 lines for data transfer
10	Acknlg	Acknowledge receipt of data
11	Busy	Signal printer is busy
12	Paper	Signal printer out of paper
13	Select	Signal printer is selected
14	Auto Feed	Enable automatic line feed
16	LG	Logic ground
17	CG	Chassis ground
31	Init	Initialize printer
32	Error	Signal error condition
33	GND	Ground
35	5V	Power (+5 VDC)
36	SLCT IN	Force printer select



### COMPUTER



### MODEM



### RS-232C Interface Standard (full implementation)

Line	Name	Purpose
1	CG	Chassis ground
2	TX	Transmitted data
3	RX	Received data
4	RTS	Signal request to send
5	CTS	Signal clear to send
6	DSR	Signal data set ready
7	LG	Logic ground
8	CD	Carrier detect
12	CD2	Secondary carrier detect
13	CTS2	Secondary clear to send
14	TX2	Secondary transmitted data
15	TC	Transmit clock (timing)
16	RX2	Secondary received data
17	RC	Receive clock (timing)
19	RTS2	Secondary request to send
20	DTR	Signal data terminal ready
21	SQD	Signal quality detect
22	RD	Ring detect
23	RS	Select data rate
24	TC	Transmit clock

Pins 9-11, 18, and 25 are reserved for future use or are unassigned.



expect that they'll talk to each other.

To make matters worse, some computer makers provide you with a completely nonstandard serial port that, despite the RS-232C terminology used to describe it (see *diagram*), will certainly not work directly with an RS-232C peripheral device—although it will work with the maker's own products.

Complications aside, however, RS-232C is used to hook up so many different kinds of peripherals—printers, plotters, modems, speech synthesizers, etc.—that most micro owners can't ignore it. If you haven't already run into an RS-232C interfacing challenge in assembling your system, you probably soon will.

When considering an RS-232C peripheral to add to your system, you should make certain it will work properly with your computer and that you can easily manage the interfacing. The manual for the peripheral (or its attendant documentation) should help determine the first issue. If handling the interfacing requires skills you don't have, or if you can't make sense out of the manual (many of which are written in Middle High Gibberish), prevail on your dealer to do the job for you.

## RS-232C INTERFACING

In last month's "Hands On," we explored adding an internal modem to your computer via a card-edge connection. Now, let's solve the alternative problem—that of adding an external modem to your computer via an RS-232C connection.

If your computer has an RS-232C serial port designated as a "modem," or a "communications" port, and is fitted with a male DB-25 connector (see last month's "Hands On" for a picture of what this connector looks like), interfacing should be a breeze. All you'll probably need is a standard configuration cable that is fitted with a male DB-25 connector at the modem end and a female DB-25 connector at the computer end. If your computer's RS-232C port connector has the wrong "sex," a male-male or a female-female cable can be procured instead. Or, you can buy a standard male-female cable and attach a so-called "gender reverser" between it and the computer's RS-232C connector.

If your computer's RS-232C port is a more general-purpose type, it is likely that either the operating system software or the communication program you plan to use will let you configure the software to suit the modem's requirements. In this case, a standard cable should still suffice,

as all the machinations necessary to make the two devices talk together are being done internally.

Sometimes, however, a computer's RS-232C port will be wired in a fashion incompatible with the modem's requirements. The problem here may reside in the RS-232C standard's distinction between Data Terminal Equipment (DTE) and Data Communication Equipment (DCE). The primary difference between DTE and DCE devices is that they use lines 2 and 3 (which transmit and receive data—see diagram) of the RS-232C link in opposing manners. DTE devices transmit data over pin 2, and receive it over pin 3. DCE devices do the opposite: receiving data on pin 2, transmitting on pin 3; so hooking a DTE device to a DCE device is usually a straightforward proposition.

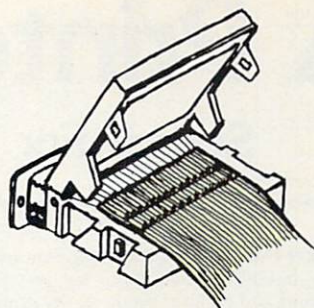
The fun begins when you try to interface two devices of the *same* type, e.g., DCE to DCE or DTE to DTE. And, while modems are always wired internally to be DCE, serial printer ports (on your computer), printers, and other peripherals may be either one. If your computer's serial port is wired DCE-style (like your modem), you'll have a problem making the two connect. Depending on the specifics of the devices involved, however, making the interface may be as simple as exchanging the lines connecting pins 2 and 3 on one end of an otherwise standard RS-232C cable or buying what's known as a "null modem" adapter. Check the modem manual for instructions.

## MAKING YOUR OWN CABLES

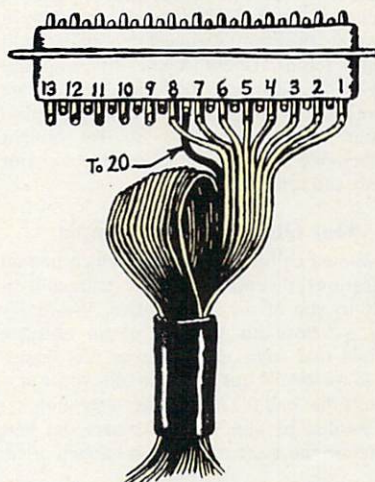
Making your own RS-232C (or other interface) cables is pretty easy, and can be far less expensive than buying them ready-made or having them made for you. Before you begin, however, you have to be sure you completely understand the pattern of connections required and have a diagram—preferably one found in a manual or approved by an expert—in hand for guidance.

To make a "standard" RS-232C cable, for example, you'll need two DB-25 connectors and a length of "ribbon cable" or multiple-conductor, color-coded wire. This little project will give you an opportunity to try out your soldering skills (for information about soldering, see "Hands On, Getting Started as a Computer Tinkerer," in the October 1985 issue of FAMILY COMPUTING).

The technique is simple and the connections (see above) straightforward. Pins 1 through 8 and 20 are connected "straight-up." Just strip

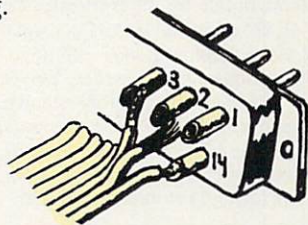


"Alligator" DB-25 connectors have "teeth" that penetrate conductors in ribbon cable for a (sturdy?) and easy-to-make interface.



"Standard" RS-232C cable connects pins 1-8 and 20 at each end. Heat-shrink tubing can be used to wrap loose wire.

an eighth of an inch of insulation from each end of the conductors, tin with a small amount of solder, and connect according to the pattern shown. To help you keep track of which wire goes where, the connectors are numbered alongside each pin. You can use heat-shrink tubing or tape to cover the exposed wiring, or spend a little more and buy DB-25 connectors with "hoods" that screw together to cover the wiring. If you're not up to soldering, there are even DB-25 connectors with "teeth" (see above) that can be used to make standard cables. Before installing the cable, double-check the numbering.



To connect conductors to DB-25 "solder tails," strip about 1/8 inch of insulation, tin with small amount of solder, insert in tail, and flow a little more solder over junction. A small vise is helpful for holding the connector while attaching wires.

There you have it: communication made not so hard. Next time, let's build a logic probe. **FC**



# A Printer For All Reasons

## Search For The Best High Quality Graphic Printer

If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all the major brands and tested them.

### Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We didn't want a "close-out special" of an obsolete product that some manufacturer was dumping, so we limited our search to only those new printers that had the latest proven technology. We wanted to give our customers the best printer on the market today at a bargain price.

### The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the SP-1000 from Seiko-sha, a division of Seiko (one of the foremost manufacturers in the world). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full bi-directional, logic seeking, true descender printer.

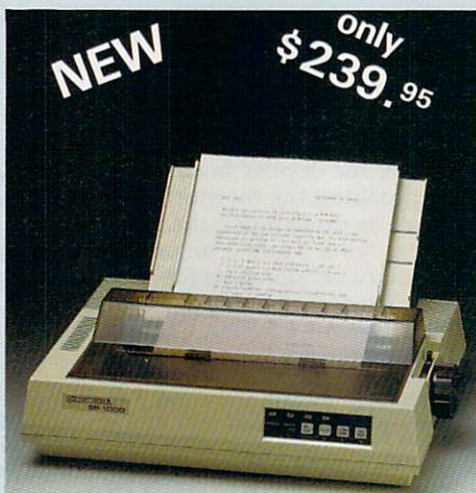
### "NLQ" Mode

One of our highest concerns was about print quality and readability. The SP-1000 has a print mode termed Near Letter Quality printing (NLQ mode). This is where the SP-1000 outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 24 (horizontal) by 18 (vertical). This equates to 41,472 addressable dots per square inch. Now we're talking *quality* printing. It looks like it was done on a typewriter. You can even print graphics using the standard graphics symbols built into your computer. The results are the best we've ever seen. The only other printers currently available having resolution this high go for hundreds more.

### Features That Won't Quit

With the SP-1000 your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 35 character styles including 13 double width and 3 reversed (white on black) styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print H<sub>2</sub>O or X<sup>2</sup>. This fantastic

machine will do it automatically, through easy commands right from your keyboard. Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) or use *italics* to make the words stand out. Or, if you wish to be even more emphatic, underline the words. You can combine many of these modes and styles to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line. You have variable line spacing of 1 line per inch to infinity (no space at all) and 143 other software selectable settings in between. You can control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and ... VOILA! The letter now fits on one page.



### Forms? Yes!

#### Your Letterhead? Of Course!

Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4 to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, labels, anything you choose. Any size to 10" in width. In fact this unit is so advanced, it will load your paper automatically. Multiple copies? Absolutely! Use forms (up to 3 thick). Do you want to use spread sheets with many columns? Of course! Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½" wide page, and you can do it quietly. The SP-1000 is rated at only 55 dB. This is quieter than any other impact dot matrix printer that we know of and is quieter than the average office background noise level.

### Consistent Print Quality

Most printers have a ribbon cartridge or a single spool ribbon which gives nice dark

printing when new, but quickly starts to fade. To keep the printers output looking consistently dark, the ribbons must be changed quite often. The SP-1000 solves this problem by using a wide (½") ribbon cartridge that will print thousands of pages before needing replacement. (When you finally do wear out your ribbon, replacement cost is only \$11.00. Order #2001.)

### The Best Part

When shopping for a printer with this quality and these features, you could expect to pay much more. *Not now!* We sell this fantastic printer for only \$239.95! You need absolutely nothing else to start printing — just add paper (single sheet or fanfold tractor).

### No Risk Offer

We give you a 2-week satisfaction guarantee. If you are not completely satisfied for any reason we will promptly refund your purchase. The warranty has now been extended to 2 years. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours of receipt.

### The Bottom Line

Be sure to specify the order # for the correct version printer designed for your computer.

Commodore C-64 & C-128, Order #2200, graphics interface & cable built in.

IBM-PC and compatibles, Order #2100, plus 8' shielded cable #1103, \$26.00

Standard Parallel with 36 pin Centronics connector, Order #2400, no cable

Standard Serial with RS-232 (DB-25) Connector, Order #2500, no cable

We also have interfaces and cables for many other computers not listed. Call Customer Service at 805/987-2454 for details.

Shipping and insurance is \$10.00 — UPS within the continental USA. If you are in a hurry, UPS Blue (second day air), APO or FPO is \$22.00. Canada, Alaska, Mexico are \$30.00 (air). Other foreign is \$70.00 (air). California residents add 6% tax. The above are cash prices — VISA and MC add 3% to total. We ship the next business day on money orders, cashiers' checks, and charge cards. A 14-day clearing period is required for checks.

### Dealer inquiries invited

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Camarillo, CA 93010







# TIPS TO THE TYPIST

Typing in FAMILY COMPUTING'S programs is a great way to become familiar with your computer and get some free software "to boot." But it's frustrating to type in a long program only to find it doesn't work as it should. When this happens, simple typing errors are most often the cause. So to help you gain greatest value from the time you spend computing with us, we've put together some tips on how to avoid typing errors—and what to do if a program doesn't run right. Read them carefully and you'll be up and running in no time!

## SOME GENERAL RULES

**1. Do** read instructions and program headings carefully. Make sure your computer has enough memory, the right version of BASIC, and the appropriate peripherals (joysticks, printers, disk drives, etc.) for a program.

**2. Don't** let fatigue and boredom contribute to inaccuracy. If you're new to programming, try typing in shorter programs first. Type in a longer program in easy stages, saving each installment as you go.

**3.** Until you are fairly familiar with BASIC, **do** assume that every word, number, letter, space, and punctuation mark in a program listing must be copied accurately if the program is to function as intended.

**4. Do** watch out for potential trouble spots. About 90 percent of all typing errors occur in DATA statements: long lines filled with numbers or incomprehensible secret codes. If possible, have someone else read DATA to you as you type, and help you proofread it if you have trouble later on. Proofreading from a printout is best.

**5. Do** be aware that program listings printed in FAMILY COMPUTING sometimes differ from what you will see on your computer's screen or in printouts you produce at home. Our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press RETURN or ENTER until you've checked to see if the program "line" you're typing really ends there. The way to tell is to check if the line following begins with a multiple of 10 that follows in sequence from the previous logical line. REM statements are the exception and typing them in is optional.

Several computers (ADAM, Apple, Atari, and TI) format BASIC programs according to unique rules of their own. Don't let this throw you—just type in the listing exactly as printed in the magazine and your computer is guaranteed to accept it, even though it may end up looking a little different on your screen.

**6.** One foolproof way to correct an error in a BASIC program line is to type the line in again from the beginning, and press RETURN or ENTER to set it in place of the old one in your computer's memory.

## WHICH PROGRAMS WILL RUN ON MY COMPUTER?

Unless a program heading indicates otherwise, programs

will run on any version of the computer specified, with the following exceptions:

- Apple programs run under Applesoft (not Integer) BASIC on the Apple II (with language card), II plus, IIe, and IIc.

- IBM compatibility of BASIC programs is determined by both the hardware and the version of BASIC used. Our programs for IBM PC & compatibles are composed on IBM PC & PCjr's, and tested under most versions of BASIC available for these machines. They are then tested on a variety of IBM-compatible machines under the versions of BASIC supplied with them. Each "IBM PC & compatibles" program listing is supplemented by a rundown of the machines and versions of BASIC under which the program is guaranteed to work. Most programs will probably run on many other PC Compatibles and under other versions of BASIC.

- TI programs not marked "w/TI Extended BASIC" should be run under standard (console) TI BASIC.

## DEBUGGING HINTS

Sometimes even the most careful typist makes a mistake. Don't expect your program to run right off the bat. If you have problems, remain patient and follow these general instructions for a probable quick fix.

**1.** Write down any error messages you receive.

**2.** If necessary, look these up in your manual, and check the indicated lines for simple mistakes. Also check related lines (see No. 4, below), such as the DATA statements corresponding to a READ routine. Correct all the problems you can find, and SAVE a corrected copy of the program before typing RUN again. If you're lucky, all systems will be GO; if not . . .

**3.** LIST the program in screen-size chunks (check your manual for instructions on how to LIST parts of a program). Even better, if you have a printer, get a printout. Compare what you've typed in—letter by letter—to the published program. Make sure that you haven't typed the numeral 0 (which is slashed in our listings) for the letter O (which isn't), swapped a small letter "l" for the numeral one, dropped or mixed up some punctuation, switched uppercase text for lowercase, or vice versa (particularly in DATA statements or within quotes), or miscounted the characters (and/or spaces) between a pair of quotes. Get someone to help you if possible.

**4.** Check your DATA statements—then check them again. Mistakes in DATA statements are the single most common cause of program failures. Bad data can cause a program to malfunction at any point, which can be misleading. If you can't find your error in the lines the computer specifies, check your DATA statements line by line, letter by letter, comma by comma. Then have someone else check it for you.

**5.** If all else fails, turn off your computer and relax. Then try again the next day—exhausted proofreaders are careless proofreaders.



# AVERAGING

Includes tutorial on Arrays

BY JOEY LATIMER AND JOHN JAINSCHIGG



Sooner or later, almost everybody needs to average a group of numbers. An average can help you get a "handle" on the statistics in your life, from bowling scores to test scores, from utility costs to stock prices.

This month's Beginner Program calculates the average of any group of figures you supply. Type in the program, save it to disk or cassette, and type RUN. The first thing the program does is ask how many figures you wish to average. (Note to TI owners: because of the limitations of TI console BASIC, the TI version of *Averaging* can accept no more than 100 figures.) Type in the number and press RETURN or ENTER. Next, the program will ask for

your actual values, one by one. Type these in, pressing RETURN or ENTER after each one.

When you've finished entering the values, the computer will redisplay them in the order entered, then tell you their average.

## TUTORIAL: ARRAYS

The *Averaging* program has to remember all the values you enter so that it can redisplay them at the end of its run. To do this, the program stores your values in an array—a kind of variable that can contain more than one piece of data. Just as with regular variables, there are two kinds of arrays. Numeric arrays store groups of numbers, while string arrays store groups of strings (sets of one or more characters).

You can think of an array as a system of compartments, grouped together under a single name. The compartments lie in a row, each numbered according to its position. (Most computers also permit more complex arrays—those with several rows of compartments.) To view or change the contents of a particular compartment, you identify it first by its group name, then by its number. Thus, the first compartment of an array called *ARRAY* is referred to as *ARRAY(0)*; the second, *ARRAY(1)*; the third, *ARRAY(2)*; and so on.

In computer terminology, these compartments are called *elements*, and their associated numbers, *indices* (singular: *index*). Each array element acts

like a simple variable. Numeric array elements can be given values and can be used in calculations; string array elements can be manipulated just like regular strings.

## USING ARRAYS

A simple variable relates one piece of information to a particular name, while an array groups many pieces of information under a single name and relates each piece to a number. Arrays thus provide a convenient means of handling bodies of related information in the form of numbered lists or tables. For example, suppose you were writing a five-player game program, and needed a place to store five scores. At the beginning of each round, you'd want to set all players' scores at zero. Using simple variables, you might write:

```
10 S1=0
20 S2=0
30 S3=0
40 S4=0
50 S5=0
```

That's not too complicated, providing five scores is all you'll ever need. But what if you wanted to store 10 scores? Or 30? Imagine how many different variable names and assignment statements you'd need!

Using an array to store the scores lessens the number of statements required for this operation:

```
10 FOR I=0 TO 4
20 S(I)=0
30 NEXT I
```

See what's happening? The FOR/NEXT loop sets variable *I* equal to 0, 1, 2, 3, and 4 in turn. Line 20 uses *I* as an index (see *above*) to successive elements of the array *S* and sets each to zero. This approach saves two statements, even in our simplest example. Moreover, if we wanted to store 10, or 30, or more scores, we would only have to change the limit of the FOR/NEXT loop (currently, a

4), to 9, or 29, or whatever number we liked.

Similarly, the *Averaging* program requires only a few statements to accept any number of values you may wish to enter. A simple FOR/NEXT loop and INPUT statement serve to store the values in succeeding elements of an array (see lines 70–110, *opposite*). Another FOR/NEXT loop prints them out again when you're done (see lines 160–180). Just imagine trying to do this with regular variables. A separate INPUT statement and unique variable name would be required for each value. Many PRINT statements would be required to print the values out again.

## DECLARING ARRAY SIZE

A simple variable can only store one number or one string, but an array can store as many elements—or as few—as you want it to. There's a catch, though. Unless you declare an array's size, your computer has no way of knowing how many elements your array will need. Arrays are declared with the DIM (for "dimension"—a word meaning "size") statement. For example, if you wanted to write a program using a numeric array *AR*, with 15 elements, you would declare it with the expression DIM AR(14) (elements zero to 14 comprise a total of 15 elements). This statement would probably be placed near the beginning of the program.

Dimensioning an array sets aside a block of memory to contain all its elements. If you forget to DIM an array before referring to one of its elements, your computer will probably give you an error message. (Note: Most versions of BASIC allocate memory automatically for arrays of up to 11 elements—so you don't absolutely have to DIMENSION such small arrays. However, it's considered good programming



practice to do so.)

All versions of BASIC let you declare an array's size using a regular number, as shown above. Most (the TI being an exception) also let you declare array size with a variable's value. That means a program can declare an array's size according to conditions of a particular run. In *Averaging*, for example, it's impossible to anticipate how many numbers a user may wish to enter—hence how many array elements will be required to contain them. *Averaging* gets around this problem by asking the user how many numbers to expect, putting the response in a variable, and then DIMENSIONING the storage array with this value. In the TI console BASIC version, this approach isn't feasible. Instead, an array of 100 elements is declared in hope that most users won't want to enter more than this many figures. The drawback in this case is that if a user elects to enter only a few numbers, the remaining elements of the array are wasted space. Note that *Averaging* does not use the "0th" element of its array.

Once an array is dimensioned to contain a particular number of elements, its size can't (practically speaking) be changed in the course of a program's run. That's why *Averaging* doesn't go back and start over automatically when it's finished working with one group of figures. (Note: There's one way around this limitation on most computers. Executing a CLR (clear) expression will dispose of all arrays and variables in a program. However, since CLR has such a radical effect, careful programmers don't often use it.) In most cases, it's best to plan ahead and make sure that your arrays are sufficiently large to contain all the values you'll need to store in a single run.

—J.J.

## ANATOMY OF A PROGRAM

Clear the screen and place the cursor at the top.

Ask the user how many numbers he/she wants to average. Accept this number with an INPUT statement, and place it in variable N.

DIMENSION an array, A, to contain N elements.

Clear the screen again.

Set variable SM (for "sum") to zero. As each number is entered by the user, it will be added to SM. When all numbers have been entered, SM's value will be equal to their total, and will be used to calculate their average.

Begin a FOR/NEXT loop to accept numbers from the user for averaging. Since N numbers must be entered, the statements in the loop must be performed N times. The loop index variable, I, will point to successive elements of array A, in which the numbers will be stored. During each loop cycle...

1. Prompt the user to enter a number.

2. Accept the number, placing it in the "I'th" element of array A.

3. Add A(I) to variable SM, maintaining the running total.

End of the loop. If the loop has cycled N times, continue. Otherwise, go back to get another number.

Calculate the average, AV, by dividing the sum of all values, SM, by the number of values entered, N.

Clear the screen.

Print column headings for redisplay of numbers stored in array A. The comma in this statement positions the headings several spaces apart on the screen.

Print a blank line.

Begin a FOR/NEXT loop to print out the indices and contents of array A. N elements must be printed out, so the loop must cycle N times. Variable I will point to successive elements of the array. During each loop cycle...

Print the current value of I, then the value of the "I'th" element of A. The comma in this statement places each value under the appropriate heading.

End of the loop. If the loop has cycled N times, continue. Otherwise, go back and print another index and element value.

Print a blank line.

Announce the computed average, AV, preceded by an appropriate message. End of the program.

### Apple II series/Averaging

```

10 HOME
20 PRINT "HOW MANY NUMBERS WOULD YOU"
30 INPUT "LIKE TO AVERAGE? ";N
40 DIM A(N)
50 HOME
60 SM = 0
70 FOR I = 1 TO N
80 PRINT "WHAT IS VALUE #";I;
90 INPUT A(I)
100 SM = SM+A(I)
110 NEXT I
120 AV = SM/N
130 HOME
140 PRINT "INDEX","VALUE"
150 PRINT
160 FOR I = 1 TO N
170 PRINT I,A(I)
180 NEXT I
190 PRINT
200 PRINT "THE AVERAGE OF YOUR"
210 PRINT "VALUES IS ";AV;"."
    
```



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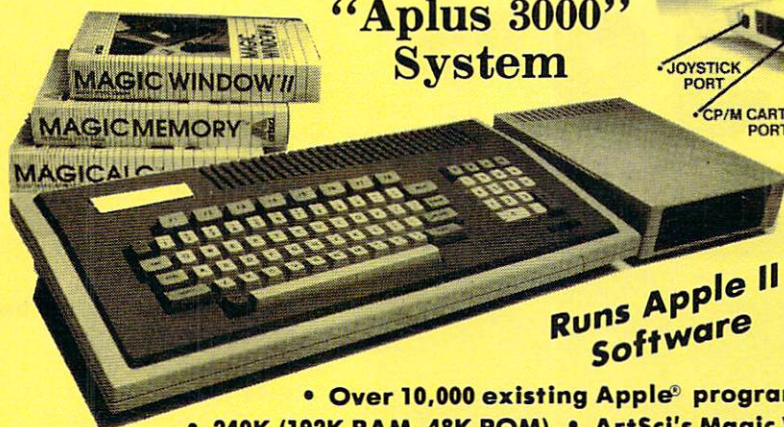
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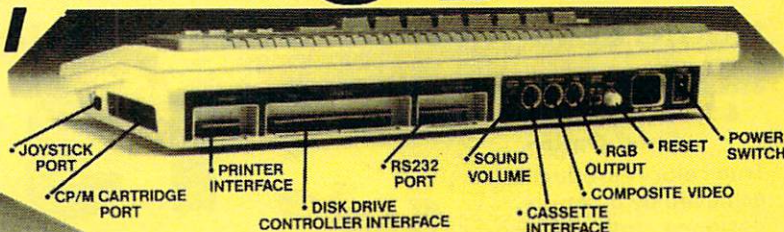
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- Centronics printer interface included
- RGB (80 columns in color) and composite included

## SPECIFICATIONS

**A plus 3000** is a complete, self-contained computer based on the popular 6502A microprocessor and can tap into the tremendous software library of Apple II. Features include 192K Bytes RAM, 32KB Enhanced Microsoft BASIC, 80 column text, 560H X 192V color graphic display, 81 key sculptured keyboard and high efficiency switching power supply. Also included as standard are Centronics bus printer interface, Cassette interface, 4 channel sound generator, and 5¼" Apple Compatible Disk Drive.

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- Upper and lower case characters.
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- Character set with normal, inverse and flashing capabilities.

### • GRAPHICS

- 280H X 192V 6 colors — Black, White, Violet, Green, Blue, Orange.
- 280H X 192V 8 colors bit image — Black, White, Red, Green, Blue, Cyan, Magenta, Yellow.
- 560H X 192V 6 colors — Black, White, Violet, Green, Blue, Orange. (High resolution color monitor required)

## More Features than Apple® for less than Commodore®

Features	Aplus 3000	Apple IIe	Commodore C-128
RAM	192K	64K	128K
Runs Apple II Software	Yes	Yes	No
Function Keys	24	None	16
4 Voice, 6 Octave Sound	Yes	No	Yes
Composite Video	Yes	Yes	Yes
Disk Drive	Included	Extra Cost	Extra Cost
Numeric Keypad	Included	Extra Cost	Included
Video Cable	Included	Extra Cost	Extra Cost
RGB Color Card	Included	Extra Cost	Included
80 Column Card	Included	Extra Cost	Included
Centronics Printer Interface	Included	Extra Cost	Extra Cost
Drive Controller	Included	Extra Cost	Included
\$150 Wordprocessor (Magic Window)	Included	Extra Cost	Extra Cost
\$150 Spreadsheet (MagiCalc)	Included	Extra Cost	Extra Cost
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RGB cable (RGB Monitor hookup)	\$ 24.95	\$ 19.95
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Technical reference manual	\$ 29.95	\$ 19.95
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Many Popular Systems**

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## Compatibility Chart

Computer	Interfaces Via
Apple II	Composite
Aplus 3000	RGB
Apple III	RGB
IBM PC	RGB
Commodore 128	RGB/Composite
Commodore 64	Composite
Commodore Vic-20	Composite
TI 99/4	Composite
Atari 800	Composite
Atari 1200	Composite
Atari 1400	Composite

**The ZVM 131  
Sound Of Quality**

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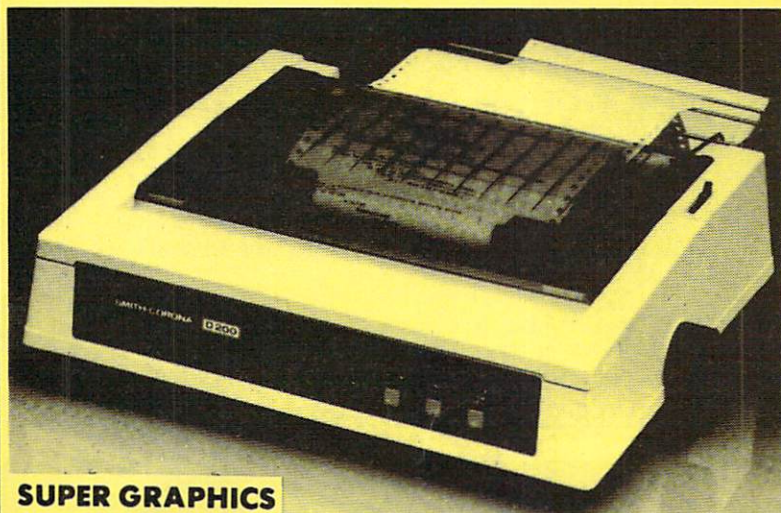
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**(IBM — Commodore)**

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Height 5.04" Width 16.7"  
Depth 13.4" Weight 18.7 lbs.

**Internal Char. Coding**

ASCII Plus ISO

**Print Buffer Size**

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120/160 CPS Plus LQM: 2K

**No. of Char. in Char. Set**

96 ASCII Plus International

**Graphics Capability**

Standard 60, 72, 120 DPI

Horizontal 72 DPI Vertical

**Pitch**

10, 12, 16.7, 5, 6, 8.3, Proportional Spacing

**Printing Method**

Impact Dot Matrix

## SPECIFICATIONS

**Char. Matrix Size**

9H x 9V (Standard) to 10H x 9V  
(Emphasized & Elongate)

**Printing Features**

Bi-directional, Short line seeking, Vertical  
Tabs, Horizontal Tabs

**Forms Type**

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**Max Paper Width**

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**Character Set**

96 ASCII

11 x 7 International Char.

**Line Spacing**

6/8/12/72/144 LPI

**Character Spacing**

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16.7 cpi condensed; 8.3 cpi elongated  
condensed; 5.12.5 cpi elongated proportional

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## BEGINNER PROGRAM

### Adam/Averaging

```

10 HOME
20 PRINT "How many numbers would you"
30 INPUT "Like to average? ";n
40 DIM a(n)
50 HOME
60 sm = 0
70 FOR i = 1 TO n
80 PRINT "What is value #";i;
90 INPUT a(i)
100 sm = sm+a(i)
110 NEXT i
120 av = sm/n
130 HOME
140 PRINT "INDEX","VALUE"
150 PRINT
160 FOR i = 1 TO n
170 PRINT i,a(i)
180 NEXT i
190 PRINT
200 PRINT "The average of your"
210 PRINT "values is ";av;"."

```

### Atari 400, 800, 600/800 XL, & 130XE/Averaging

```

10 PRINT CHR$(125);
20 PRINT "HOW MANY NUMBERS WOULD YOU"
30 PRINT "LIKE TO AVERAGE";
40 INPUT N
50 DIM A(N)
60 PRINT CHR$(125);
70 SM=0
80 FOR I=1 TO N
90 PRINT "WHAT IS VALUE # ";I;
100 INPUT V
110 A(I)=V
120 SM=SM+A(I)
130 NEXT I
140 AV=SM/N

```

```

150 PRINT CHR$(125);
160 PRINT "INDEX","VALUE"
170 PRINT
180 FOR I=1 TO N
190 PRINT I,A(I)
200 NEXT I
210 PRINT
220 PRINT "THE AVERAGE OF YOUR VALUES IS ";AV;"."

```

### Commodore 64 & 128 (C 64 mode)/Averaging

```

10 PRINT CHR$(147);
20 PRINT "HOW MANY NUMBERS WOULD YOU"
30 INPUT "LIKE TO AVERAGE";N
40 DIM A(N)
50 PRINT CHR$(147);
60 SM=0
70 FOR I=1 TO N
80 PRINT "WHAT IS VALUE #";I;
90 INPUT A(I)
100 SM=SM+A(I)
110 NEXT I
120 AV=SM/N
130 PRINT CHR$(147);
140 PRINT "INDEX","VALUE"
150 PRINT
160 FOR I=1 TO N
170 PRINT I,A(I)
180 NEXT I
190 PRINT
200 PRINT "THE AVERAGE OF YOUR VALUES IS";AV

```

### IBM PC & compatibles\* & Tandy Models III & 4/ Averaging

```

10 CLS
20 PRINT "HOW MANY NUMBERS WOULD YOU"
30 INPUT "LIKE TO AVERAGE";N
40 DIM A(N)
50 CLS

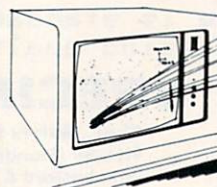
```

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About the Creator: *Marilyn Davis (Ph.D., UCSD, Radio Astronomy)* is also the author of the widely acclaimed *BASIC Primer*, published by IBM.

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```

60 SM=0
70 FOR I=1 TO N
80 PRINT "WHAT IS VALUE #";I;
90 INPUT A(I)
100 SM=SM+A(I)
110 NEXT I
120 AV=SM/N
130 CLS
140 PRINT "INDEX","VALUE"
150 PRINT
160 FOR I=1 TO N
170 PRINT I,A(I)
180 NEXT I
190 PRINT
200 PRINT "THE AVERAGE OF YOUR VALUES IS";AV

```

\*This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown. IBM PC w/Color Graphics/Monitor Adapter or Monochrome/Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cassette BASIC C1.20 or Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC version 00.05.00 or 01.01.00.

### Macintosh w/Microsoft BASIC 2.0/Averaging

```

CLS
INPUT "HOW MANY VALUES WOULD YOU LIKE TO AVERAGE";N
DIM A(N)
CLS
SM=0
FOR I=1 TO N
PRINT "WHAT IS VALUE #";I;
INPUT A(I)
SM=SM+A(I)
NEXT I
AV=SM/N
CLS
PRINT "INDEX","VALUE"
FOR I=1 TO N
PRINT I,A(I)
NEXT I
PRINT
PRINT "THE AVERAGE OF YOUR VALUES IS";AV

```

### TI-99/4A/Averaging

```

10 DIM A(100)
20 CALL CLEAR
30 PRINT "HOW MANY NUMBERS WOULD YOU"
40 PRINT "LIKE TO AVERAGE (MUST BE"
50 INPUT "NO MORE THAN 100)? ":N
60 CALL CLEAR
70 SM=0
80 FOR I=1 TO N
90 PRINT "WHAT IS VALUE #";I;
100 INPUT A(I)
110 SM=SM+A(I)
120 NEXT I
130 AV=SM/N
140 CALL CLEAR
150 PRINT "INDEX","VALUE"
160 PRINT
170 FOR I=1 TO N
180 PRINT I,A(I)
190 NEXT I
200 PRINT
210 PRINT "THE AVERAGE OF YOUR VALUES"
220 PRINT "IS";AV

```

### Tandy Color Computer/Averaging

```

10 CLS
20 PRINT "HOW MANY NUMBERS WOULD YOU"
30 INPUT "LIKE TO AVERAGE";N
40 DIM A(N)
50 CLS
60 SM=0
70 FOR I=1 TO N
80 PRINT "WHAT IS VALUE #";I;
90 INPUT A(I)
100 SM=SM+A(I)
110 NEXT I
120 AV=SM/N
130 CLS
140 PRINT "INDEX","VALUE"

```

# Nashua

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```
150 PRINT
160 FOR I=1 TO N
170 PRINT I,A(I)
180 NEXT I
190 PRINT
200 PRINT "THE AVERAGE OF YOUR"
210 PRINT "VALUES IS";AV
```

# VIC-20/Averaging

```
10 PRINT CHR$(147);
20 PRINT "HOW MANY NUMBERS"
30 PRINT "WOULD YOU LIKE TO"
40 INPUT "AVERAGE";N
50 DIM A(N)
60 PRINT CHR$(147);
70 SM=0
80 FOR I=1 TO N
90 PRINT "VALUE #";I;
100 INPUT A(I)
110 SM=SM+A(I)
120 NEXT I
130 AV=SM/N
140 PRINT CHR$(147);
150 PRINT "INDEX","VALUE"
160 PRINT
170 FOR I=1 TO N
180 PRINT I,A(I)
190 NEXT I
200 PRINT
210 PRINT "THE AVERAGE OF YOUR"
220 PRINT "VALUES IS";AV
```

# COMPUTERS WE COVER

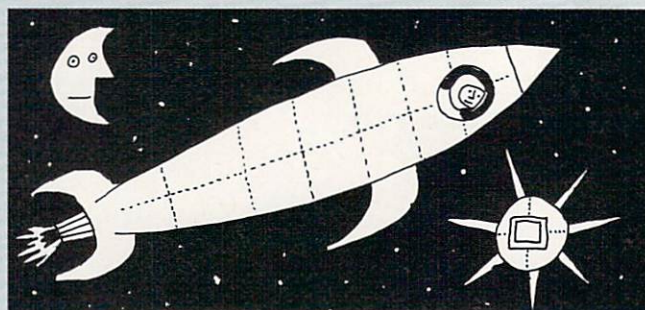
We regularly present two or more programs in each issue for the Apple II series; Atari 400/800, 600/800XL, & 130XE; Commodore 64 and 128 (in C 64 mode); IBM PC and compatibles; Macintosh; and Tandy Models III/4 and Color Computer. However, occasionally we have to omit versions when a program requires capabilities that some of these computers lack. For example, we usually won't run a Tandy Model III or 4 version of a program featuring sound and/or color graphics. And many Microtones programs can only run on computers that have three voices, which eliminates the Apple II series; IBM PC and compatibles (except the PCjr with Cartridge BASIC and the Tandy 1000); and Tandy Models III, 4, and Color Computer.

In addition, we publish at least one program each issue for the Adam, TI-99/4A, and VIC-20. In the future, we also hope to cover the Atari 520ST and the Amiga. This month, these programs can be found here in The Programmer and in Microtones (in the K-POWER section of FAMILY COMPUTING).

# SPACE DEBRIS

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Machine-Language  
Game for Commodore 64  
& 128 (C 64 Mode)

BY JOEY LATIMER



The year is 2021. Space, the final frontier, is getting crowded. The orbital zones are filling up with space debris and your job is to recycle the junk.

Collecting space debris can be very profitable. U.S. satellites are worth 250 Plutons of solar currency to the enterprising salvage operator. Other satellites are worth 100 Plutons, while asteroids and stray spaceships command a price of 50 Plutons . . . enough for lunch at the Cosmic Burger Stand.

Sitting at a computer console, alone in your dome-home on the moon, you control your robot space scow with a joystick. Your ship is equipped with mouth-like capture doors that open when you press the fire button. Racking up the Plutons by glomming space junk with this rig ought to be a piece of cake, right?

Well . . . not exactly. You see, each time you open

the capture doors to snap up some tasty morsel of junk, precious fuel is used up. Luckily, fuel canisters are floating around up there with all the other stuff, and each time you snarf one down, your fuel is restored . . . for a while. Keep your eye on the gauge at the bottom of the screen. There's nothing worse than losing your ship because you ran out of gas!

Well . . . almost nothing worse. Missiles are another problem. In the late 20th century, hundreds of stray missiles ended up in orbit as the result of a computer failure at a meteorite shooting range. If one of these babies hits your ship, you might as well phone your insurance agent. Those missiles are deadly!

As you can see, recycling space debris can earn you a good living, but it isn't calm work. Good luck, pilot . . . you'll need it!

**Note:** *Space Debris* requires a joystick in Port 2.

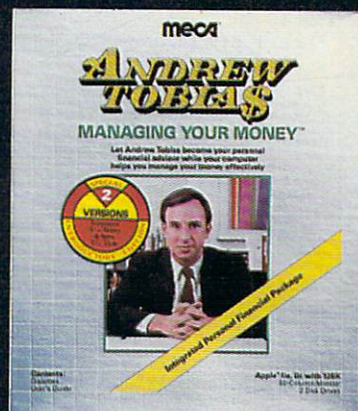
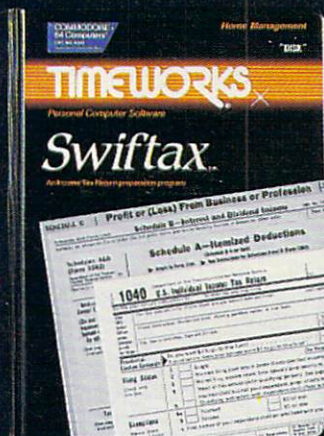
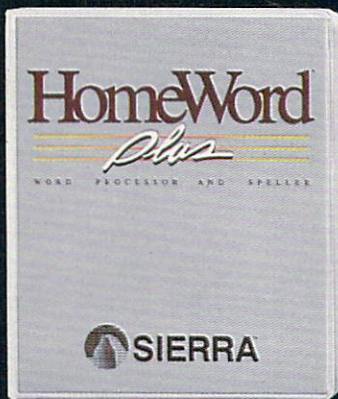
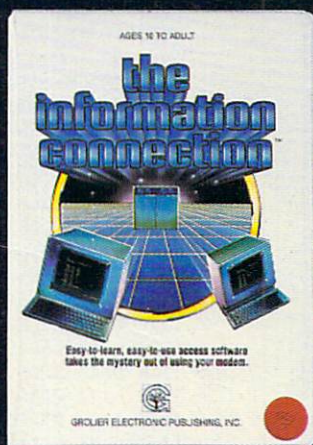
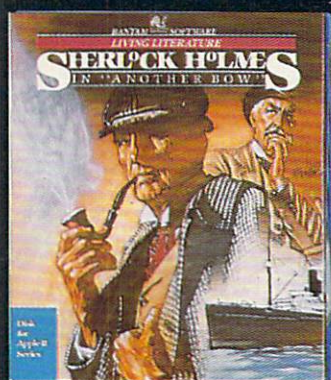


# FAMILY COMPUTING SHOWCASE PROGRAM

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# ARCADE GAME

## Commodore 64 & 128 (C 64 mode) w/Joystick/ Space Debris

```

10 POKE 52,48:POKE 56,48:CLR
20 POKE 53281,0:POKE 53280,14
30 PRINT CHR$(147):CHR$(154);
40 V=53248:S=54272:SL=828:DX=829:DY=830:AD=247
50 HS="000000":HS=0:LN=3000:SM=0
60 FOR I=0 TO 24:POKE S+I,0:NEXT I
70 POKE S+19,24:POKE S+20,136:POKE S+24,15
80 POKE 1,PEEK(1) OR 4:POKE 56334,PEEK(56334) OR 1
90 FOR I=12544 TO 12751:GOSUB 1000:POKE I,VL:NEXT I
100 FOR I=15808 TO 16383:GOSUB 1000:POKE I,VL:NEXT I
110 FOR I=0 TO 6:POKE 2040+I,AD
120 AD=AD+1-2*(AD=247):NEXT I
130 J=SL+6:FOR I=0 TO 46
140 IF I=21 OR I=23 THEN 160
150 IF (I>16 AND I<27) OR (I>33 AND I<37) THEN 180
160 GOSUB 1000:POKE V+I,VL
170 IF I>1 AND I<14 THEN POKE J,VL:J=J+1
180 NEXT I
190 FOR I=0 TO 1014:GOSUB 1000
200 POKE I+49152,VL:NEXT I
210 IF SM=191840 THEN 230
220 PRINT "THERE IS AN ERROR IN YOUR DATA.":STOP
230 FOR I=1 TO 39:BS=BS+CHR$(34):NEXT I:CS=LEFT$(BS,8)
240 PRINT CHR$(147);
250 ST$="":FOR I=1 TO 64
260 IF RND(1)>.9 THEN ST$=ST$+CHR$(33):GOTO 280
270 ST$=ST$+CHR$(32)
280 NEXT I
290 FOR I=SL+19 TO SL+24
300 POKE I,INT(RND(1)*190)+30:NEXT I
310 POKE 53272,(PEEK(53272) AND 240)+12
320 FOR I=1 TO 23
330 PRINT MID$(ST$,INT(RND(1)*32)+1,31):CHR$(34)
340 NEXT I
350 PRINT BS;:POKE 214,23:PRINT
360 POKE 211,31:PRINT LEFT$(BS,8);
370 POKE 1983,34:POKE 2023,34
380 POKE 56295,14:POKE 56255,14
390 POKE 214,23:PRINT
400 PRINT CHR$(158);"";CHR$(149):CS;CHR$(28):CS;
410 PRINT:CHR$(150):CS;CHR$(158):LEFT$(CS,5):"";
420 POKE 214,2:PRINT:PRINT CHR$(150):TAB(33);"##%*"
430 PRINT TAB(33);"(')*+##"
440 POKE 214,8:PRINT:PRINT TAB(33);CHR$(155);"##%*"
450 POKE 214,15:PRINT:PRINT TAB(33);"+.-"
460 PRINT TAB(33);"##%*"
470 POKE DX,123:POKE DY,192:POKE V,123:POKE V+1,192
480 FOR I=0 TO 9
490 POKE SL+6+I,0:POKE V+2+I,0:POKE SL+32+I,0:NEXT I
500 POKE SL+25,217:POKE V+12,217
510 POKE 214,10:PRINT:PRINT TAB(33);CHR$(154);"000000";
520 POKE 214,18:PRINT:PRINT TAB(33);HS$
530 POKE V+21,127:P=PEEK(V+30)
540 POKE S,48:POKE S+1,4
550 POKE S+5,24:POKE S+6,17:POKE S+4,129
560 SYS 49152
570 POKE 2040,249:POKE V+5,0
580 POKE S+5,24:POKE S+6,237
590 POKE S+12,24:POKE S+13,237
600 POKE S+4,129:POKE S+11,129
610 FOR I=1 TO 20:POKE V+39,INT(RND(1)*8)
620 POKE S+0,INT(RND(1)*50)
630 POKE S+1,INT(RND(1)*4)+1
640 POKE S+7,INT(RND(1)*50)+50
650 POKE S+8,INT(RND(1)*4)+5
660 NEXT I:POKE V+39,15:POKE S+4,128:POKE S+11,128
670 PRINT CHR$(147):CHR$(154)
680 POKE 53272,(PEEK(53272) AND 240)+5
690 POKE V+21,0:POKE 2040,247
700 PRINT:PRINT TAB(4);"-----"
710 IF PEEK(SL+25)>1 THEN 740

```

```

720 PRINT:PRINT TAB(4);"SORRY, YOU RAN OUT OF FUEL."
730 GOTO 750
740 PRINT:PRINT TAB(5);"YOU WERE HIT BY A MISSILE."
750 PRINT:PRINT TAB(4);"-----"
760 SC$="":FOR I=0 TO 4
770 N=PEEK(SL+36-I)+48:SC$=SC$+CHR$(N):NEXT I
780 SC=VAL(SC$)
790 PRINT TAB(124)"YOUR SCORE WAS";SC;"PLUTONS."
800 IF SC<HS THEN 840
810 HS$=SC$:HS=SC:SC$="000000"
820 PRINT TAB(4);"YOU NOW HAVE THE HIGH SCORE!"
830 GOTO 860
840 PRINT
850 PRINT TAB(4);"THE HIGH SCORE IS";HS;"PLUTONS."
860 PRINT:PRINT
870 PRINT TAB(4);"PRESS FIRE BUTTON TO PLAY AGAIN."
880 IF (PEEK(56320) AND 16)<>0 THEN 880
890 GOTO 240
1000 IF QS="" THEN GOSUB 2000
1010 VL=ASC(LEFT$(QS,1)):QS=RIGHT$(QS,LEN(QS)-1)
1020 RETURN
2000 PRINT "NOW PROCESSING DATA IN LINE";LN
2010 CK$="":FOR LP=1 TO 4:READ HB$:CK$=CK$+HB$
2020 NEXT LP:READ CS
2030 QS=0:FOR PZ=1 TO LEN(CK$)-1 STEP 2
2040 HA=ASC(MID$(CK$,PZ,1)):LA=ASC(MID$(CK$,PZ+1,1))
2050 DV=16*(HA-48+7*(HA>64))+LA-48+7*(LA>64)
2060 QS=QS+CHR$(DV):QS=QS+DV:NEXT PZ
2070 IF QS<>CS THEN PRINT "THERE IS AN ERROR IN LINE";
LN:STOP
2080 SM=SM+CS:LN=LN+10:RETURN
3000 DATA 00000000,00000000,00000040,00000000,64
3010 DATA FFFFFFFF,FFFFFFF,FEC6C0FE,0ECEFE00,3412
3020 DATA 7E6666FE,E0E0E000,7E6666FE,E6E6E600,2530
3030 DATA FEC6C0E0,E0E6FE00,7E6666F8,E0E0FE00,2844
3040 DATA FEC6C6E6,E6E6FE00,FCCCCCFE,E6E6FE00,3222
3050 DATA FCCCCCFE,E6E6E600,18181838,38383800,1900
3060 DATA 7E6666E6,E6E6FE00,666666FE,E6E6E600,2524
3070 DATA 7E6666EE,E6E6FE00,3F30303C,70707000,1831
3080 DATA 7E6666E6,E6E6FE00,18181838,38383800,1570
3090 DATA FEC606FE,E0E0FE00,FE06063E,0E0EFE00,2024
3100 DATA C6C6C6FE,0E0E0E00,FEC6C0FE,0E0EFE00,2070
3110 DATA FEC6C0FE,E6E6FE00,FEC60C18,38383800,2268
3120 DATA 7C6464FE,E6E6FE00,FEC6C6FE,0ECEFE00,2670
3130 DATA 03FFC00F,FFF03FFF,FC7FFF7F,FFFF7FFF,3186
3140 DATA FFFFFFFF,FFFFFFF,FFFFFFF7F,FFF7FFF,3823
3150 DATA FE1FFF8F,03FFC000,7E0003FF,C00FFF00,2324
3160 DATA 1FFFF83F,FFFC3C7E,3C783C1E,F87E1F00,1965
3170 DATA 00000000,00000000,00600006,F0000FF8,605
3180 DATA 001FFC00,3FFE007F,FF00FF7F,81FE7FFF,2129
3190 DATA FE1FFF8F,03FFC000,7E0003FF,C00FFF00,2324
3200 DATA 1FFFF83F,FFFC3C7E,3C783C1E,F87E1F00,1965
3210 DATA 01FFF013,0198465C,621C0630,B0FB0131,1503
3220 DATA 8C1D47B7,0CC83986,8C68E2C4,CE216766,1936
3230 DATA 61333461,131CE259,818268E3,0E2C330C,1370
3240 DATA 361B381B,0E7000CD,CC06318,001E0000,865
3250 DATA 01FE0003,C70007FF,8007FF80,07FF800F,1642
3260 DATA 87C01EB5,E016A5A0,10A42010,B42016A5,1736
3270 DATA A01EA5E0,0EA5C006,858007FF,8007FF80,1997
3280 DATA 07FF8007,FF8003C7,0001EE00,007C0000,1345
3290 DATA 03838003,C78003FF,8001FF00,007C0000,1488
3300 DATA 7C00007C,00007C00,007C0000,7C00007C,744
3310 DATA 00007C00,007C0000,7C00007C,00007C00,620
3320 DATA 007C0000,38000038,00001000,00100000,268
3330 DATA 00000000,7E0001FB,000FDFC0,1F3FE017,1149
3340 DATA F6703F94,B86B9FF8,SEF39057,D9F85FFF,2650
3350 DATA D8677FD8,2F7EF839,7EF01967,701F67F0,2120
3360 DATA 1FFFE00F,7FC0072F,0001F800,00000000,1147
3370 DATA 00000000,00063000,0C180018,0C7F3007,404
3380 DATA C1E0033E,6006330,1FC1FC10,0004115D,1337
3390 DATA C4115144,115DC411,45441145,4411DD44,1282
3400 DATA 18000C0F,FFF80441,100C7F18,18000C00,838
3410 DATA 00FFC001,80600300,30060018,0C00080C,785
3420 DATA 00180E00,380B80E8,8AFFA8CA,AAA96AAA,1843

```



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## ARCADE GAME

```

3430 DATA AB3AAAAE,1AAACAB8,AAAB0AAA,A80AAAA8,2143
3440 DATA 1EAAB833,AAAC61AA,E6C0FBC3,801F0100,2072
3450 DATA 00000000,00000000,00000000,00000000,0
3460 DATA 00000000,00000000,00000000,00000000,0
3470 DATA 00000000,00000000,00000000,00000018,20
3480 DATA 00003C00,007E0000,7E00003C,00001800,396
3490 DATA FFFF0000,00000000,00000000,D9E40000,955
3500 DATA 00000013E,00410000,0E000000,0F070A0C,186
3510 DATA 040D0000,A90320E9,C3AD3D03,8D0D00AD,1408
3520 DATA 3E038D01,D0AD4103,C900D016,A9F88DF8,1893
3530 DATA 07CE5503,AD55038D,0CD0A900,CD5503D0,1593
3540 DATA 0660A9F7,8DF807AD,0BC40000,A200A0B0,1879
3550 DATA 01884AB0,01C84AB0,01CA4AB0,01E84A8E,1740
3560 DATA 3F038C40,039008A9,018D4103,4C60C0A9,1337
3570 DATA 008D4103,AD3F03C9,FFD009CE,3D03CE3D,1658
3580 DATA 034C7AC0,C901000E,EE3D03EE,3D03AD40,1650
3590 DATA 03C9FFD0,09CE3E03,CE3E034C,94C0C901,1836
3600 DATA D006EE3E,03EE3E03,A91ACD3D,039006B0,1575
3610 DATA 3D034CAB,C9A9DECD,3D03B003,8D03D03A,1716
3620 DATA 32CD3E03,9006BD3E,034CC2C0,AD90CD3E,1766
3630 DATA 03B0038D,3E03A903,20E9C3AD,4303D016,1493
3640 DATA A5A2CD4F,03D04D08,D0D08D42,03AD4503,1720
3650 DATA 82D8D02D,DCC3EE43,03CE4203,AD42038D,1802
3660 DATA 00D0ADF8,07C9F7F0,19AD4203,8D5603AD,1996
3670 DATA 43038D57,03A9008D,5A0320EA,C2AD5B03,1431
3680 DATA D007A9FE,CD4303B0,05A9008D,4303AD43,1714
3690 DATA 038D03D0,4C039D0C,19A5A2CD,503D004B,1731
3700 DATA C91EB002,692CC9DC,90E26964,8D04D0B0,1824
3710 DATA 4403EE45,03EE4503,AD3D03E9,0BCD4403,1448
3720 DATA B0176930,CD44039D,10AD3E03,CD4503B0,1479
3730 DATA 086914CD,45039001,60A9F0CD,4503B005,1518
3740 DATA A9008D45,03AD4503,8D05D0AD,4703D020,1468
3750 DATA A5A2CD51,03D0578D,06D08D46,03A2FC8E,2036
3760 DATA FE07A5A2,6964CD4F,039005A2,F88EFB07,2036
3770 DATA EE4703EE,4603AD46,038D06D0,AD8F07C9,1853
3780 DATA F7F019A9,328D5A03,AD46038D,5603AD47,1688

```

```

3790 DATA 038D5703,20EAC2AD,5B03D007,A9F0CD47,1861
3800 DATA 03B005A9,008D4703,AD47038D,07D0AD4A,1418
3810 DATA 03D022A5,A2CD5203,D053C91E,B0026948,1742
3820 DATA C9D09002,695A8D08,0D084803,AD54A038D,1736
3830 DATA 2BD020DC,3CEEA403,EE4A03AD,F807C9F7,2204
3840 DATA F019A9FA,8D5A03AD,48038D56,03AD4A03,1646
3850 DATA 8D570320,EAC2AD5B,03D007A9,FACD4A03,1874
3860 DATA B005A900,8D4A03AD,4A038D09,D0AD4E03,1430
3870 DATA 0D22A5A2,CD5303D0,56C91EB0,026955C9,1954
3880 DATA DC900269,5A8D0AD0,8D4B03AD,54038D2C,1584
3890 DATA D020DC33,EE4E03AD,F807C9F7,F019A964,2384
3900 DATA 8D5A03AD,4E038D56,03AD4E03,8D570320,1232
3910 DATA EAC2AD5B,03D007A9,F5CD4E03,B00BA900,1966
3920 DATA 8D4E038D,0BD04C9B,C2AD4E03,8D0BD0EE,1859
3930 DATA 4F03A205,A9FEC04F,03B0038E,4F03EE50,1680
3940 DATA 03A203A9,05D05003,B0038E50,03EE5103,1564
3950 DATA A20BA9FA,CD5103B0,038E5103,EE5203A2,1771
3960 DATA 03A9FEC0,5203B003,8E5203EE,5303A20B,1608
3970 DATA A9EECD53,03B0038E,53034C00,C060A900,1638
3980 DATA 8D5B03AD,3D03E905,CD5603B0,F06921CD,1763
3990 DATA 560390E9,AD3E03E9,08CD5703,B0DF690C,1756
4000 DATA CD570390,D8A9F78D,F807A901,8D5B03AD,2045
4010 DATA 5A03D024,A9118D12,D4EE5503,AD5038D0,1622
4020 DATA 0CD0A23B,8E0FD4D2,BE80ED4,C9D990E4,2320
4030 DATA A9108D12,D44CE9C2,A200A921,8D12D4EE,2032
4040 DATA 5A03E8A9,1A8D0FD4,8A8D0ED4,ECSA03F0,1962
4050 DATA 4EEE5C03,AD5C039A,0AD008A9,008D5C03,1511
4060 DATA EE5D03AD,5D03C90A,D008A900,8D5D3EE,1674
4070 DATA 5E03AD5E,03C9A00D,08A9008D,5E03EE5F,1534
4080 DATA 03AD5F03,C9AD008A,A9008D5F,03EE6003,1446
4090 DATA AD6003C9,0AD0ABA9,008D6003,4C4EC318,1644
4100 DATA AD600369,308D905,AD5F0369,308D0A05,1576
4110 DATA AD5E0369,308DDB05,AD5D0369,308DDC05,1576
4120 DATA AD5C0369,308DD005,A9208D12,D44CE9C2,1863
4130 DATA EE5403A9,089005A9,018D5403,608D5903,1378
4140 DATA A0008B0D,FDCE5903,D0F86000,00000000,1607

```

## SOLUTION TO UPHILL DRIVE

Here's what you have to do:

First, change SF = 1 to SF = 2 in line 20.

Second, in line 20, change the text between the quotes from "LAST NAME" to the kind of answer you'll be seeking at the checkpoint. . . , "STATE CAPITAL" in the case of our example. This item can be rather long (up to 80 characters). For example, "AMERICAN-LEAGUE TEAM THIS PLAYER PLAYED FOR IN 1975".

Third, delete lines 7000-7020 and 8000.

Fourth, type in your own new DATA statements. Enter lines numbered 7000, 7010, 7020, etc. Begin in each with the word DATA. Following that, enter your 18 "license plates" in order: first the three license plates at elevation zero, then the three license plates at elevation 1,000, etc.; for a total of 18. All entries must be in capital letters. In our example, we'd have:

7000 DATA NEW YORK,CALIFORNIA,FLORIDA,TEXAS,OHIO,PENNSYLVANIA

7010 DATA IDAHO,COLORADO,NORTH DAKOTA,SOUTH DAKOTA

7020 DATA NORTH CAROLINA,SOUTH CAROLINA,VERMONT,MAINE

7030 DATA MINNESOTA,NEW MEXICO,GEORGIA,WASHINGTON

Then, enter lines 8000, 8010, 8020, etc. Begin in each with the word DATA and then enter the 18 "passwords", each corresponding in order to the "license plates" you entered above. For our example, you'd enter:

8000 DATA ALBANY,SACRAMENTO,TALLAHASSEE,AUSTIN,COLUMBUS,HARRISBURG

8010 DATA BOISE,DENVER,BISMARCK,PIERRE

8020 DATA RALEIGH,COLUMBIA,MONTPELIER,AUGUSTA

8030 DATA ST. PAUL,SANTA FE,ATLANTA,OLYMPIA

Keep in mind that the computer is very literal and will accept an answer only if it matches the correct answer character-by-character. For example, if the right answer is "25", the program will not recognize "twenty-five" or "25.0" as being correct. However, the program automatically converts all the answers typed in at the checkpoints to uppercase, so if the answer is "VanWyck", the program will also accept "VANWYCK", "van-Wyck", and even "vandyck" (but not "Van Wyck").

## BONUS PROGRAM

Each name sounds like a number: Wong (one); Lu (two); Tree (three); Ford (four); Fyfe (five); and Sticks (six). Don the disguises in ascending order on your route up the mountain (starting at the first checkpoint as Mr. Wong and ending at the sixth checkpoint as Dr. Sticks). One of the three license plates at each checkpoint will combine with the name for that level to form a common word or expression. The correct pairing of names and license plates is as follows: Wong/DEERUL ("wonderful"; Tw/NIGHT ("tonight"); Tree/D ("3-D"; Ford/2BY ("2-by-4"); Fyfe/AND 10 ("5 and 10"); and Sticks/SENSE ("sixth sense").

## CONCLUSION TO *UPHILL DRIVE*

... are greeted by Herr Heffter, a towering giant who holds out a plate upon which rest two crisp, freshly baked chocolate-chip cookies. "Just a final precaution," mentions Heffter, suggesting that anyone legitimately belonging at the factory would know which one to choose. You reach for a cookie, trying to wash the panic from your face with a nervous grin. The cookie is delicious and you seem none the worse for your unexpected snack.

You assume the identity of the new chef and successfully accomplish your mission. As the afternoon passes peacefully, you take a deep breath of relief. Suddenly, . . . SNAP! You've popped a button on your pants. "It must have been a bit loose," you hope.





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# DO OR DIET! A Drive Up Calorie Mountain

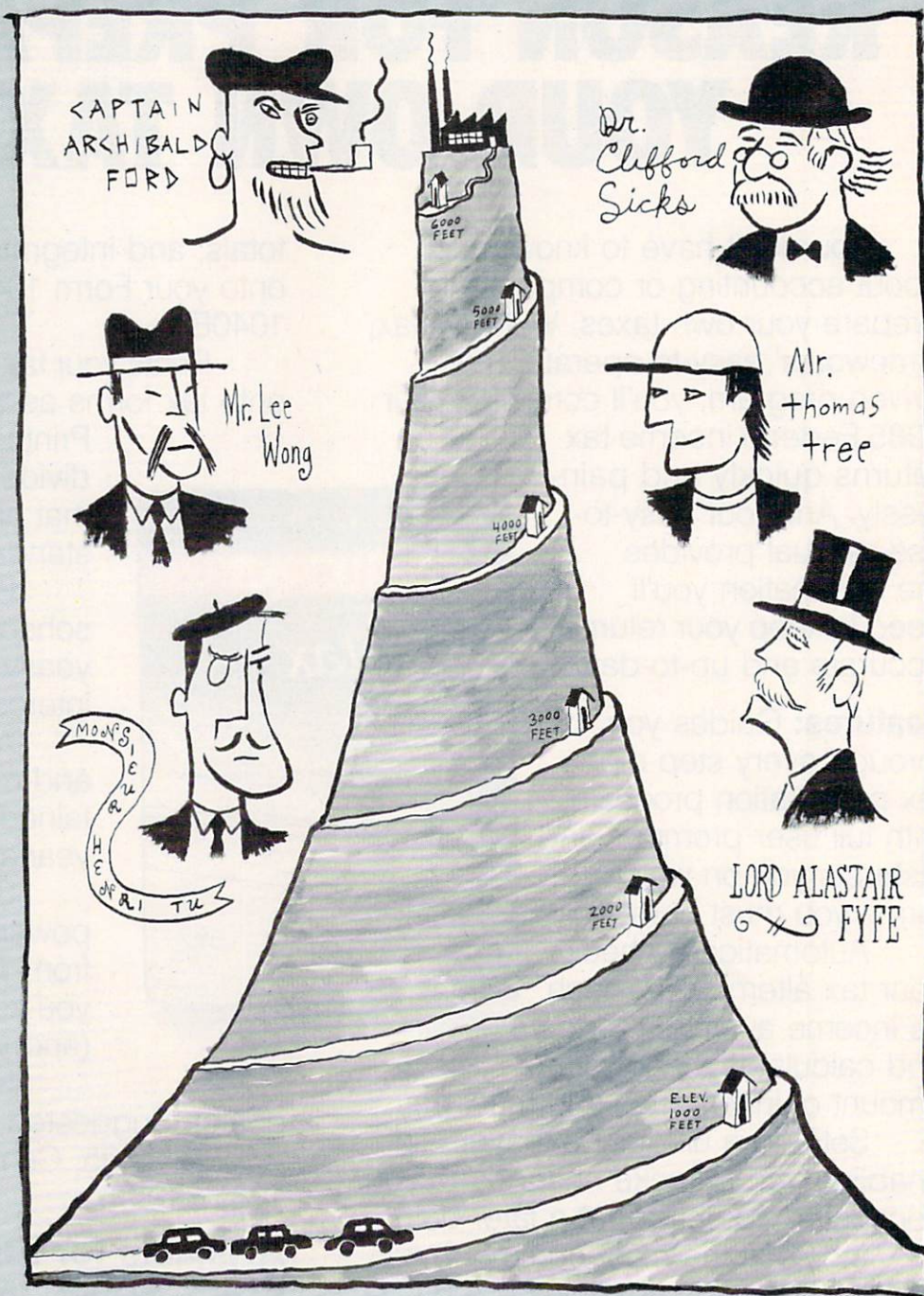
PUZZLE BY SARAH KORTUM AND PETER FAVARO  
PROGRAM BY STEVEN C.M. CHEN

Once you've solved this puzzle, you can keep having fun with the program by making it into your own personalized quiz game. Details are given after the solution on page 52. But don't read them now unless you're sure you don't want to try the puzzle first.

The crisp atmosphere and beautiful snow-covered peaks of the Swiss Alps form the perfect cover for the diabolical workings of Herr Heiffer and his evil henchmen. After taking over the world's most famous chocolate factory, high atop Calorie Mountain, Heiffer devised a formula for a super-fat-tening but irresistible chocolate-chip cookie. His plan is to package complimentary samples of these cookies and distribute them to police, espionage, and secret service forces worldwide. Once every law enforcement official becomes too heavy to chase after Heiffer and his henchmen, the world will be at his mercy.

Your job, if you choose to accept it, is to infiltrate Heiffer's organization and thwart his plan. Your big break comes when you intercept a coded bulletin from Calorie Mountain. It seems that a new head chef is expected at the factory. The last cook mistakenly ate three of the cookies and had to be given a warehouse assignment because he could no longer fit through the factory doors. If you can impersonate the new chef and ensconce yourself in the factory, it will be easy for you to foil Heiffer by substituting less fattening ingredients.

The hard part will be



getting past the tight security on the way up Calorie Mountain. There are six checkpoints, each heavily patrolled by guards. As an extra precaution, visitors must switch into six disguises and change cars six times on their way up the mountain. Only invited visitors are informed of the six disguises to don.

## THE SIX DISGUISES

Fortunately, the bulletin informs the new chef of the six disguises he should use: Captain Archibald Ford—a salty old mariner wearing a large gold hoop earring in his right ear; Mr. Lee Wong—a chocolate-chip fortune-cookie entrepreneur sporting a long, thin mous-

tache; Monsieur Henri Tu—a monocled French statesman wearing a beret; Dr. Clifford Sicks—a bespectacled nutritionist and famous author of the best-selling "Bavarian Junk-Food Diet"; Mr. Thomas Tree—wearing the uniform of a landscaping company hired to maintain the factory grounds; and Lord Alas-







tair Fyfe—a British gentleman wearing a red sports jacket emblazoned with his family crest and a pair of shiny patent leather riding boots.

Unfortunately, the bulletin you intercepted does not inform the new chef of the order in which to don these disguises. But it does mention that when he arrives at the bottom of Calorie Mountain he will find three parked cars. One of the license plates will give him a clue as to the first disguise to don. The other two license plates will be red herrings, designed to throw off an impostor. After selecting a car and a matching disguise, the new chef should drive up to the first checkpoint at the 1,000-foot elevation. If his choices are correct, the guard will wave him on, and just around the next bend he will find three new cars. Again, he should switch disguises and cars and drive on to the next checkpoint at 2,000 feet. This procedure will be repeated four more times until he reaches the factory, just past the sixth checkpoint.

It will be difficult, but not impossible, for a spy of your caliber to make it up Calorie Mountain. You must think carefully; the steep mountain roads require a quarter-tank of gas between each checkpoint, and there are no gas stations on the mountain. Should you appear at a particular checkpoint driving the wrong car or using the wrong disguise, you will be turned back. There is gas enough for only a certain number of errors. If you do run out of gas, you're out of luck. The high altitude and freezing winds restrict walking on the mountain. Good luck, drive carefully, and for goodness' sake, don't stop for a snack of milk and cookies on the way up!

## HOW TO PLAY

Type each line of the

program into your computer exactly as shown, carefully making the appropriate modifications (if needed). (See "Tips to the Typist," page 40, for help with typing in programs.) Then SAVE the program to disk or cassette.

When you RUN the program, you will see your elevation (which starts at zero) and the license-plate numbers of the three cars waiting for you. Type in the license plate of the car you want to drive, and press RETURN or ENTER. (If you make a mistake, the screen will clear and you'll be given another chance.) As long as the car you choose has some gas, you'll then drive up the hill to the next checkpoint. As you drive, you'll see the elevation increase and your gas supply (shown by an on-screen gas gauge) decrease.

When you arrive at the next level, a guard will stop you at the checkpoint and ask for your name. Answer with the last name corresponding to the disguise you've chosen for this leg of your route, and press RETURN or ENTER. If you answer correctly—and are driving the correct car—you'll be allowed to continue around the bend to where the next set of three cars is waiting for you. If you give the wrong answer or are driving the wrong car, you'll have to drive back down to the previous level, where you can choose the same car again (but don't a different disguise) or select a different car.

The last checkpoint is at elevation 6,000. If you're driving the right car and give the correct name at that point, you can drive right into the factory and the program is over.

Your mission, however, isn't quite complete. Once the program ends, you'll want to turn to page 52 and read the conclusion to *Uphill Drive*.

The solution to the puzzle is also on page 52.

## Apple II series/Uphill Drive

```
20 SF = 1:SB$ = "LAST NAME"
30 IF SF = 1 THEN MY$ = "MY":YOURS$ = "YOUR":GOTO 50
40 MY$ = "THE":YOURS$ = "THE"
50 DIM AS$(18),BS$(18),ME$(3)
60 CE = 4:DL = 100:LM = 8:SW = 40
70 NORMAL:SP$ = CHR$(32):SB$ = SP$+SB$
80 FL$ = SP$:FOR X = 2 TO 22:FL$ = FL$+SP$:NEXT X
90 FOR X = 1 TO 18:READ TS:GOSUB 4000:AS$(X) = TS
100 NEXT X:IF SF = 1 THEN CK$ = "231323"
110 FOR X = 1 TO 6+12*(SF = 2):READ TS:GOSUB 4000
120 IF SF = 2 THEN BS$(X) = TS:GOTO 160
130 MS = "":V = ASC(LEFT$(TS,1))-64
140 FOR Z = 2 TO LEN(TS):N = ASC(MID$(TS,Z,1))-V
150 MS = MS+CHR$(N+26*(N < 65)):NEXT Z:BS$(X) = MS
160 NEXT X
170 FOR X = 768 TO 796:READ A:POKE X,A:NEXT X
180 FOR E = 0 TO 5:GA = 20-10*(E > 2)-5*(E > 4)
190 FOR X = 1 TO 3:ME(X) = GA:NEXT X
200 V = E:GOSUB 1000
210 MS = "YOU HAVE A CHOICE OF THREE CARS."
220 MS = MS+" THEIR LICENSE PLATES ARE ..."
230 GOSUB 2010:PRINT:FOR X = E+3+1 TO (E+1)*3
240 MS = AS$(X):GOSUB 2010:NEXT X:PRINT
250 INPUT "SELECT A CAR: ";TS:IF TS = "" THEN 200
260 GOSUB 4000:C = 0:FOR X = E+3+1 TO (E+1)*3
270 IF TS = AS$(X) THEN C = X-E+3:X = 18
280 NEXT X:IF C = 0 THEN 200
290 F = 0:FOR X = 1 TO 3:IF ME(X) = 0 THEN F = F+1
300 NEXT X:IF F < 3 THEN 330
310 MS = "ALL THE CARS ARE OUT OF GAS."
320 MS = MS+" YOU'LL HAVE TO START AGAIN.":GOTO 470
330 IF ME(C) > 0 THEN 360
340 MS = "SORRY! THAT CAR IS OUT OF GAS."
350 GOSUB 2000:GOSUB 6000:GOTO 200
360 DR = CE:GOSUB 5000
370 V = E+1:GOSUB 1000
380 MS = "HALT! YOU'VE REACHED A CHECKPOINT."
390 MS = MS+" WHAT IS "+YOURS$+SB$+"?":GOSUB 2010
400 PRINT:PRINT MY$:SB$:
410 INPUT " IS ";TS:IF TS = "" THEN 370
420 GOSUB 4000:IF (SF = 1 AND TS = BS$(E+1) AND C = VAL(MID$(CK$,E+1,1))) OR (SF = 2 AND TS = BS$(C+E+3)) THEN 490
430 MS = "SORRY, I CANNOT LET YOU THROUGH. GO BACK."
440 GOSUB 2000:GOSUB 6000
450 IF E <> 5 AND ME(C) > 0 THEN 480
460 MS = "YOU'RE OUT OF GAS. START AGAIN."
470 GOSUB 2000:END
480 DR = -CE:GOSUB 5000:GOTO 200
490 MS = "YOU'RE CLEAR!":GOSUB 2000
500 MS = "GO AHEAD.":GOSUB 2010:GOSUB 6000:NEXT E
510 MS = "CONGRATULATIONS! YOU MADE IT!"
520 GOSUB 2000:IF SF = 2 THEN 550
530 PRINT:MS = "YOU ENTER THE FACTORY DOORS AND ..."
540 GOSUB 2010:PRINT:MS = "(SEE CONCLUSION).":GOSUB 2010
550 END
1000 MS = "ELEVATION: "+STR$(V*1000)
1010 GOSUB 2000:PRINT:RETURN
2000 HOME
2010 IF LEN(MS) <= SW THEN NS = MS:GOSUB 3000:RETURN
2020 Y = SW+1:Z = 1:FOR X = Y TO 2 STEP -1
2030 IF MID$(MS,X,1) = SP$ THEN Z = 0:Y = X:Z = 2
2040 NEXT X:NS = LEFT$(MS,Y-1):GOSUB 3000
2050 MS = RIGHT$(MS,LEN(MS)-Y+Z):GOTO 2010
3000 IF LEN(NS) = SW THEN PRINT NS:RETURN
3010 PRINT TAB((SW-LEN(NS))/2+1);NS:RETURN
4000 MS = "":FOR S = 1 TO LEN(TS):K = ASC(MID$(TS,S,1))
4010 IF K > 96 AND K < 123 THEN K = K-32
4020 MS = MS+CHR$(K):NEXT S:TS = MS:RETURN
5000 HOME:ALT = V*1000
5010 VTAB 10:HTAB LM+4:PRINT "ELEVATION: ";ALT
5020 VTAB 19:HTAB LM:PRINT "EMPTY";SPC(15);"FULL"
5030 INVERSE:HTAB LM+1:PRINT FL$:HTAB LM+1
5040 PRINT SP$:LEFT$(FL$,ME(C));
```



# How to turn your computer on.

(The following is an actual conversation between Bantam Software and an unusually talkative personal computer).

**BANTAM SOFTWARE:**  
We always ask what turns people on. Now we want to know what turns you on.

**PERSONAL COMPUTER:**  
It's about time someone asked the real expert. What turns me off is boring software. Boring, uninvolving, predictable software. And cold rooms. Why is it always so cold in here?

**B:** Games and Ahoy magazines called *Sherlock Holmes* in "Another Bow" one of the year's best.

**PC:** Let me decide. Okay? (Disk inserted.) Well, this is anything but elementary. You're Holmes. Watson's at your side. And you determine your own fate in case after case. And look, you run into the likes of Picasso, Gertrude Stein, Henry Ford, Louis Armstrong. And such graphics! These derive from early 20th century photographs. I don't have a clue how you did it, but you have a winner. Next case.

**B:** *The Fourth Protocol*, from Frederick Forsyth's gigantic best-selling book. Games called it "nerve-tingling." Here you go. (Slides disk in.)

**PC:** You mean circuit-tingling. If I knew I had to save the world, I would have gotten more sleep. All kidding aside, this involves

nuclear weapons. A British traitor. The KGB. And the subversion of NATO. This is a challenge. Will it help if I read the book? (Loud explosion on screen.) Oh no! Does that mean I lost?

**B:** No, but losing's the whole point of the next one. *The Complete Scarsdale Medical Diet*. You know the bestseller.

**PC:** Why, do I look heavy? Never mind, let's have a taste.

(Disk is inserted.) This is some menu. It helps you assess your goals.

Monitor your progress. Mix 'n match meals from all five Scarsdale diets. Even prepares your shopping list. It'll tell you how much exercise you need to work off certain foods. Let's see about kiwi tart...

**B:** We've got one other program.

**PC:** No more. I'm exhausted.

**B:** No...this is a rebate program. Just fill out the coupon and mail it with proof of purchase and you get \$5.00 back.

**PC:** Thank you. That's a nice offer.

**B:** So, did we turn you on?

**PC:** Yup. Now, please turn me off so I can rest. I've got to do some running later on to work off that kiwi tart.

*Sherlock Holmes* available for: Apple //Series, Commodore 64/128, IBM PC/PCjr, Macintosh.  
*Scarsdale Medical Diet* available for: Apple //Series, IBM PC/PCjr.  
*The Fourth Protocol* available for: Commodore 64/128. Available soon for Apple //Series and IBM PC/PCjr.

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FC 2/86



```

5050 HTAB LM+22:PRINT SP$:HTAB LM+1:PRINT FL$
5060 NORMAL:FOR D = 0 TO DL*3 STEP SGN(DR):NEXT D
5070 FOR Z = 1 TO 5:ME(C) = ME(C)-1
5080 FOR D = 0 TO DL/2 STEP SGN(DR):NEXT D
5090 VTAB 21:HTAB LM+2+ME(C):PRINT SP$:
5100 R = 255-INT(RND(1)*100):IF DR > 0 THEN R = R-75
5110 FOR S = R TO R-49 STEP -1
5120 POKE 6,3+INT(RND(1)*5):POKE 8,S:CALL 768
5140 ALT = ALT+DR:VTAB 10:HTAB LM+15:PRINT ALT:SP$:
5170 NEXT S:NEXT Z:FOR D = 1 TO DL*4:NEXT D:RETURN
6000 VTAB 22:HTAB 1:M$ = "PRESS ANY KEY TO CONTINUE."
6010 GOSUB 2010:POKE -16368,0
6020 K = PEEK(-16384)-128:IF K < 0 THEN 6020
6030 POKE -16368,0:RETURN
7000 DATA FREDLU,DERFUL,RULFED,MOON,STARS,NIGHT
7010 DATA D,M,L,BY2,B2Y,2BY,MINUS10,AND10,PLUS10
7020 DATA CENTS,SCENTS,SENSE
8000 DATA SPHGZ,HBC,KECPP,SYHKW,CIBIH,JCSMUC
9000 DATA 165,8,74,133,10,164,8,173,48,192,136,234
9010 DATA 234,208,251,165,7,56,229,10,133,7,176,237
9020 DATA 198,6,208,233,96

```

### Atari 400/800, 600/800XL, & 130XE/Uphill Drive

```

10 DIM A$(750),B$(750),BK$(1),SB$(80),SP$(1)
20 SF=1:SB$="LAST NAME"
30 DIM CK$(6),FL$(22),M$(120),MY$(3),N$(40),T$(40)
40 DIM YOUR$(4),PA(19),PB(19),ME(3)
50 POKE 752,1:POKE 82,0
60 IF SF=1 THEN MY$="MY":YOUR$="YOUR":GOTO 80
70 MY$="THE":YOUR$="THE"
80 PA(1)=1:PB(1)=1:BK$=CHR$(160)
90 SP$=CHR$(32):T$=SB$:SB$=SP$:SB$(2)=T$
100 FL$(1)=CHR$(160):FL$(22)=FL$(1):FL$(2)=FL$
110 FOR X=1 TO 18:READ T$:GOSUB 3020
120 A$(PA(X))=T$:PA(X+1)=LEN(A$)+1:NEXT X
130 IF SF=1 THEN CK$="231323"
140 FOR X=1 TO 6+12*(SF=2):READ T$:GOSUB 3020
150 IF SF=2 THEN B$(PB(X))=T$:GOTO 190
160 M$="":V=ASC(T$(1))-64
170 FOR Z=2 TO LEN(T$):N=ASC(T$(Z))-V
180 M$(Z-1,Z-1)=CHR$(N+26*(N<65)):NEXT Z:B$(PB(X))=M$
190 PB(X+1)=LEN(B$)+1:NEXT X
200 FOR E=0 TO 5:GA=20-10*(E>2)-5*(E>4)
210 FOR X=1 TO 3:ME(X)=GA:NEXT X
220 V=E:GOSUB 1000
230 M$="YOU HAVE A CHOICE OF THREE CARS."
240 M$(33)=" THEIR LICENSE PLATES ARE ..."
250 GOSUB 2010:PRINT:FOR X=E*3+1 TO (E+1)*3
260 M$=A$(PA(X),PA(X+1)-1):GOSUB 2010:NEXT X:PRINT
270 PRINT "WHICH CAR DO YOU WANT";
280 POKE 752,0:INPUT T$:POKE 752,1:IF T$="" THEN 220
290 GOSUB 3020:C=0:FOR X=E*3+1 TO (E+1)*3
300 IF T$=A$(PA(X),PA(X+1)-1) THEN C=X-E*3:X=18
310 NEXT X:IF C=0 THEN 220
320 F=0:FOR X=1 TO 3:IF ME(X)=0 THEN F=F+1
330 NEXT X:IF F<3 THEN 360
340 M$="ALL THE CARS ARE OUT OF GAS."
350 M$(29)=" YOU'LL HAVE TO START AGAIN.":GOTO 540
360 IF ME(C)>0 THEN 390
370 M$="SORRY! THAT CAR IS OUT OF GAS."
380 GOSUB 2000:GOSUB 6000:GOTO 220
390 DR=8:GOSUB 4020
400 V=E+1:GOSUB 1000
410 M$="HALT! YOU'VE REACHED A CHECKPOINT."
420 M$(36)=" WHAT IS ":M$(46)=YOUR$:M$(LEN(M$)+1)=SB$
430 M$(LEN(M$)+1)="?":GOSUB 2010
440 PRINT:PRINT MY$:SB$: " IS ";
450 POKE 752,0:INPUT T$:POKE 752,1:IF T$="" THEN 400
460 GOSUB 3020:T=C+E*3:IF SF=2 THEN 490
470 IF T$=B$(PB(E+1),PB(E+2)-1) AND C=VAL(CK$(E+1,E+1)) THEN 560
480 GOTO 500
490 IF T$=B$(PB(T),PB(T+1)-1) THEN 560
500 M$="SORRY, I CANNOT LET YOU THROUGH. GO BACK."
510 GOSUB 2000:GOSUB 6000
520 IF E<>5 AND ME(C)>0 THEN 550
530 M$="YOU'RE OUT OF GAS. START AGAIN."

```

```

540 GOSUB 2000:GOTO 620
550 DR=-8:GOSUB 4020:GOTO 220
560 M$="YOU'RE CLEAR!":GOSUB 2000
570 M$="GO AHEAD.":GOSUB 2010:GOSUB 6000:NEXT E
580 M$="CONGRATULATIONS! YOU MADE IT!"
590 GOSUB 2000:IF SF=2 THEN 620
600 PRINT:M$="YOU ENTER THE FACTORY DOORS AND ..."
610 GOSUB 2010:PRINT:M$="(SEE CONCLUSION).":GOSUB 2010
620 POKE 752,0:POKE 82,2:END
1000 M$="ELEVATION: ":M$(12)=STR$(V*1000)
1010 GOSUB 2000:PRINT:RETURN
2000 PRINT CHR$(125);
2010 IF LEN(M$)<=40 THEN N$=M$:GOSUB 3000:RETURN
2020 Y=41:Z=1:FOR X=Y TO 2 STEP -1
2030 IF M$(X,X)=SP$ THEN Z=0:Y=X:Z=2
2040 NEXT X:N$=M$(1,Y-1):GOSUB 3000
2050 M$=M$(Y+1-Z,LEN(M$)):GOTO 2010
3000 IF LEN(N$)=40 THEN PRINT N$:RETURN
3010 POKE 85,INT(20-LEN(N$)/2):PRINT N$:RETURN
3020 M$="":FOR S=1 TO LEN(T$):K=ASC(T$(S,S))
4000 IF K>96 AND K<123 THEN K=K-32
4010 M$(LEN(M$)+1)=CHR$(K):NEXT S:T$=M$:RETURN
4020 PRINT CHR$(125):ALT=V*1000
5000 POSITION 12,10:PRINT "ELEVATION: ";ALT
5010 POSITION 8,19:PRINT "EMPTY"
5020 POSITION 28,19:PRINT "FULL"
5030 POSITION 9,20:PRINT FL$
5040 POSITION 9,21:PRINT FL$(1,ME(C)+1);
5050 POSITION 30,21:PRINT BK$
5060 POSITION 9,22:PRINT FL$
5070 FOR D=0 TO 150 STEP SGN(DR):NEXT D
5080 FOR Z=1 TO 5:ME(C)=ME(C)-1
5090 FOR D=0 TO 25 STEP SGN(DR):NEXT D
5100 POSITION 10+ME(C),21:PRINT SP$
5110 R=250-INT(RND(1)*100):IF DR>0 THEN R=R-50
5120 FOR S=R TO R-49 STEP -2:ALT=ALT+DR
5130 FOR L=0 TO 1:SOUND 0,S,8,L*2:SOUND 1,S-10,10,L*4
5140 NEXT L:POSITION 23,10:PRINT ALT:SP$:
5150 FOR D=1 TO 2+RND(1)*6:NEXT D:NEXT S
5160 SOUND 0,0,0,0:SOUND 1,0,0,0:NEXT Z
5170 FOR D=1 TO 200:NEXT D:RETURN
6000 POSITION 7,22:PRINT "PRESS ANY KEY TO CONTINUE.";
6010 OPEN #1,4,0,"K":GET #1,K:CLOSE #1:RETURN
7000 DATA FREDLU,DERFUL,RULFED,MOON,STARS,NIGHT
7010 DATA D,M,L,BY2,B2Y,2BY,MINUS10,AND10,PLUS10
7020 DATA CENTS,SCENTS,SENSE
8000 DATA SPHGZ,HBC,KECPP,SYHKW,CIBIH,JCSMUC

```

### Commodore 64 & 128 (C 64 mode)/ Uphill Drive

```

10 POKE 53281,14:PRINT CHR$(142);CHR$(8);CHR$(5)
20 SF=1:SB$="LAST NAME"
30 IF SF=1 THEN MY$="MY":YOUR$="YOUR":GOTO 50
40 MY$="THE":YOUR$="THE"
50 DIM A$(18),B$(18),ME(3)
60 OS=CHR$(146):R$=CHR$(18)
70 SP$=CHR$(32):SB$=SP$:SB$
80 FL$=SP$:FOR X=2 TO 22:FL$=FL$+SP$:NEXT X
90 FOR X=1 TO 18:READ T$:GOSUB 4000:A$(X)=T$:NEXT X
100 IF SF=1 THEN CK$="231323"
110 FOR X=1 TO 6-12*(SF=2):READ T$:GOSUB 4000
120 IF SF=2 THEN B$(X)=T$:GOTO 160
130 M$="":V=ASC(LEFT$(T$,1))-64
140 FOR Z=2 TO LEN(T$):N=ASC(MID$(T$,Z,1))-V
150 M$=M$+CHR$(N-26*(N<65)):NEXT Z:B$(X)=M$
160 NEXT X:B=54272:FOR X=B TO B+24:POKE X,0:NEXT X
170 POKE B+24,15:POKE B+5,9:POKE B+6,0:POKE B+2,50
180 POKE B+3,2:FOR E=0 TO 5:GA=20-10*(E>2)+5*(E>4)
190 FOR X=1 TO 3:ME(X)=GA:NEXT X
200 V=E:GOSUB 1000
210 M$="YOU HAVE A CHOICE OF THREE CARS."
220 M$=M$+" THEIR LICENSE PLATES ARE ..."
230 GOSUB 2010:PRINT:FOR X=E*3+1 TO (E+1)*3
240 M$=A$(X):GOSUB 2010:NEXT X:PRINT
250 T$="":INPUT "WHICH CAR DO YOU WANT";T$
260 IF T$="" THEN 200
270 C=0:FOR X=E*3+1 TO (E+1)*3
280 IF T$=A$(X) THEN C=X-E*3:X=18

```



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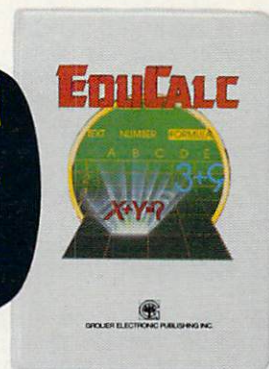
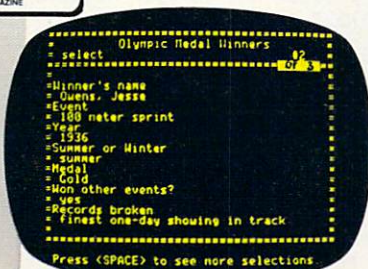
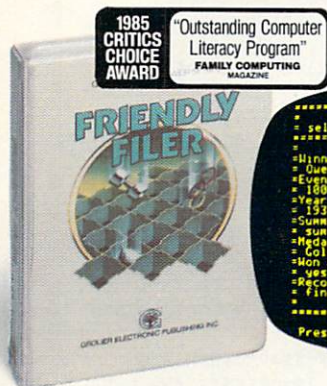
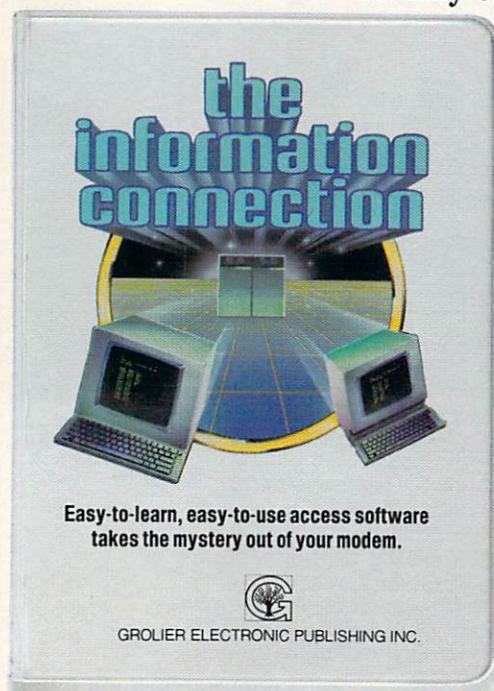
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# PUZZLE

```

290 NEXT X:IF C=0 THEN 200
300 F=0:FOR X=1 TO 3:IF ME(X)=0 THEN F=F+1
310 NEXT X:IF F<3 THEN 340
320 MS="ALL THE CARS ARE OUT OF GAS."
330 MS=MS+" YOU'LL HAVE TO START AGAIN.":GOTO 510
340 IF ME(C)>0 THEN 370
350 MS="SORRY! THAT CAR IS OUT OF GAS."
360 GOSUB 2000:GOSUB 6000:GOTO 200
370 DR=5:GOSUB 5000
380 V=E+1:GOSUB 1000
390 MS="HALT! YOU'VE REACHED A CHECKPOINT."
400 MS=MS+" WHAT IS "+YOURS+SBS+"?":GOSUB 2010
410 PRINT:PRINT MY$;SBS;
420 TS="":INPUT " IS ";TS:IF TS="" THEN 380
430 IF SF=2 THEN 460
440 IF TS=BS(E+1) AND C=VAL(MID$(CK$,E+1,1)) THEN 530
450 GOTO 470
460 IF TS=BS(C+E*3) THEN 530
470 MS="SORRY, I CANNOT LET YOU THROUGH. GO BACK."
480 GOSUB 2000:GOSUB 6000
490 IF E<>5 AND ME(C)>0 THEN 520
500 MS="YOU'RE OUT OF GAS. START AGAIN."
510 GOSUB 2000:GOTO 590
520 DR=-5:GOSUB 5000:GOTO 200
530 MS="YOU'RE CLEAR!":GOSUB 2000
540 MS="GO AHEAD.":GOSUB 2010:GOSUB 6000:NEXT E
550 MS="CONGRATULATIONS! YOU MADE IT!"
560 GOSUB 2000:IF SF=2 THEN 590
570 PRINT:MS="YOU ENTER THE FACTORY DOORS AND ..."
580 GOSUB 2010:PRINT:MS="(SEE CONCLUSION).":GOSUB 2010
590 POKE 53281,6:PRINT CHR$(9);CHR$(154):END
1000 MS="ELEVATION:"+STR$(V*1000)
1010 GOSUB 2000:PRINT:RETURN
2000 PRINT CHR$(147);
2010 IF LEN(MS)<=40 THEN NS=MS:GOSUB 3000:RETURN
2020 Y=41:Z=1:FOR X=Y TO 2 STEP -1
2030 IF MID$(MS,X,1)=SP$ THEN Z=0:Y=X:X=2
2040 NEXT X:NS=LEFT$(MS,Y-1):GOSUB 3000
2050 MS=RIGHT$(MS,LEN(MS)-Y+Z):GOTO 2010
3000 IF LEN(NS)=40 THEN PRINT NS;:RETURN
3010 PRINT SPC(20-LEN(NS))/2;NS:RETURN
4000 MS="":FOR S=1 TO LEN(TS):K=ASC(MID$(TS,S,1))
4010 IF K>96 AND K<123 THEN K=K-32
4020 MS=MS+CHR$(K):NEXT S:TS=MS:RETURN
5000 PRINT CHR$(147):ALT=V*1000
5010 POKE 214,10:PRINT:PRINT TAB(11);"ELEVATION:";ALT
5020 POKE 214,19:PRINT:PRINT TAB(7);"EMPTY";SPC(15);"F
ULL"
5030 PRINT TAB(8);R$;FL$;OS
5040 PRINT TAB(8);R$;SP$;LEFT$(FL$,ME(C));OS
5050 POKE 214,21:PRINT:PRINT TAB(29);R$;SP$;OS
5060 PRINT TAB(8);R$;FL$;OS
5070 FOR D=0 TO 150 STEP SGN(DR):NEXT D
5080 FOR Z=1 TO 5:ME(C)=ME(C)-1
5090 FOR D=0 TO 20 STEP SGN(DR):NEXT D
5100 POKE 214,21:PRINT:PRINT TAB(9+ME(C));SP$
5110 S=INT(RND(1)*30)+1:FOR R=S TO S+199 STEP 5
5120 ALT=ALT+DR:POKE B,R:POKE B+1,4:POKE B+4,65
5130 POKE 214,10:PRINT:PRINT TAB(21);STR$(ALT);SP$
5140 FOR D=1 TO 20+DR*2:NEXT D:POKE B+4,0:NEXT R
5150 NEXT Z:FOR D=1 TO 500:NEXT D:RETURN
6000 POKE 214,22:PRINT
6010 PRINT TAB(7);"PRESS ANY KEY TO CONTINUE."
6020 GET K$:IF K$="" THEN 6020
6030 RETURN
7000 DATA FREDLU,DERFUL,RULFED,MOON,STARS,NIGHT
7010 DATA D,M,L,BY2,BY2,2BY,MINUS0,AND10,PLUS10
7020 DATA CENTS,SCENTS,SENSE
8000 DATA SPHGZ,HBC,KECPP,SYHKW,CIBIH,JCSMUC

```

## IBM PC & compatibles (80-column version)/ Uphill Drive

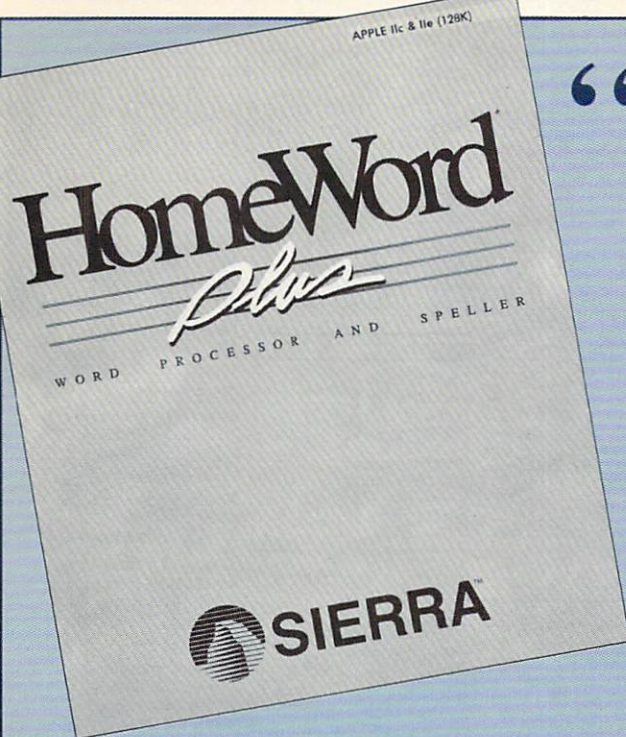
This program has been tested and found to work on the following computers and hardware configurations, using the BASiCs shown: IBM PC w/Color/Graphics Monitor Adapter or Monochrome/Printer Card, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/128K RAM, w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC version 00.05.00 or 01.01.00. IBM PCjr owners with 64K RAM should use the 40-column version, below.

```

10 KEY OFF:SCREEN 0,0
20 SF=1:SBS="LAST NAME"
30 IF SF=1 THEN MY$="MY":YOURS="YOUR":GOTO 50
40 MY$="THE":YOURS="THE"
50 DIM AS(18),BS(18),ME(3)
60 CE=4:DL=150:LM=28:SW=80:BKS=CHR$(219):WIDTH SW:LOCA
TE ,,0
70 SP$=CHR$(32):SBS=SP$+SBS
80 FL$=STRINGS(22,BK$)
90 FOR X=1 TO 18:READ TS:GOSUB 4000:AS(X)=TS:NEXT X
100 IF SF=1 THEN CK$="231323"
110 FOR X=1 TO 6-12*(SF=2):READ TS:GOSUB 4000
120 IF SF=2 THEN BS(X)=TS:GOTO 160
130 MS="":V=ASC(LEFT$(TS,1))-64
140 FOR Z=2 TO LEN(TS):N=ASC(MID$(TS,Z,1))-V
150 MS=MS+CHR$(N-26*(N<65)):NEXT Z:BS(X)=MS
160 NEXT X
170 FOR E=0 TO 5:GA=20+10*(E>2)+5*(E>4)
180 FOR X=1 TO 3:ME(X)=GA:NEXT X
190 V=E:GOSUB 1000
200 MS="YOU HAVE A CHOICE OF THREE CARS."
210 MS=MS+" THEIR LICENSE PLATES ARE ..."
220 GOSUB 2010:PRINT:FOR X=E+3+1 TO (E+1)*3
230 MS=AS(X):GOSUB 2010:NEXT X:PRINT
240 TS="":INPUT "WHICH CAR DO YOU WANT";TS
250 IF TS="" THEN 190
260 GOSUB 4000:C=0:FOR X=E+3+1 TO (E+1)*3
270 IF TS=AS(X) THEN C=X-E*3:X=18
280 NEXT X:IF C=0 THEN 190
290 F=0:FOR X=1 TO 3:IF ME(X)=0 THEN F=F+1
300 NEXT X:IF F<3 THEN 330
310 MS="ALL THE CARS ARE OUT OF GAS."
320 MS=MS+" YOU'LL HAVE TO START AGAIN.":GOTO 470
330 IF ME(C)>0 THEN 360
340 MS="SORRY! THAT CAR IS OUT OF GAS."
350 GOSUB 2000:GOSUB 6000:GOTO 190
360 DR=CE:GOSUB 5000
370 V=E+1:GOSUB 1000
380 MS="HALT! YOU'VE REACHED A CHECKPOINT."
390 MS=MS+" WHAT IS "+YOURS+SBS+"?":GOSUB 2010
400 PRINT:PRINT MY$;SBS;
410 TS="":INPUT " IS ";TS:IF TS="" THEN 370
420 GOSUB 4000:IF (SF=1 AND TS=BS(E+1) AND C=VAL(MID$(
CK$,E+1,1))) OR (SF=2 AND TS=BS(C+E*3)) THEN 490
430 MS="SORRY, I CANNOT LET YOU THROUGH. GO BACK."
440 GOSUB 2000:GOSUB 6000
450 IF E<>5 AND ME(C)>0 THEN 480
460 MS="YOU'RE OUT OF GAS. START AGAIN."
470 GOSUB 2000:GOTO 550
480 DR=-CE:GOSUB 5000:GOTO 190
490 MS="YOU'RE CLEAR!":GOSUB 2000
500 MS="GO AHEAD.":GOSUB 2010:GOSUB 6000:NEXT E
510 MS="CONGRATULATIONS! YOU MADE IT!"
520 GOSUB 2000:IF SF=2 THEN 550
530 PRINT:MS="YOU ENTER THE FACTORY DOORS AND ..."
540 GOSUB 2010:PRINT:MS="(SEE CONCLUSION).":GOSUB 2010
550 END
1000 MS="ELEVATION:"+STR$(V*1000)
1010 GOSUB 2000:PRINT:RETURN
2000 CLS
2010 IF LEN(MS)<=SW THEN NS=MS:GOSUB 3000:RETURN
2020 Y=SW+1:Z=1:FOR X=Y TO 2 STEP -1
2030 IF MID$(MS,X,1)=SP$ THEN Z=0:Y=X:X=2
2040 NEXT X:NS=LEFT$(MS,Y-1):GOSUB 3000
2050 MS=RIGHT$(MS,LEN(MS)-Y+Z):GOTO 2010
3000 IF LEN(NS)=SW THEN PRINT NS;:RETURN
3010 PRINT TAB((SW-LEN(NS))/2);NS:RETURN
4000 MS="":FOR S=1 TO LEN(TS):K=ASC(MID$(TS,S,1))
4010 IF K>96 AND K<123 THEN K=K-32
4020 MS=MS+CHR$(K):NEXT S:TS=MS:RETURN

```





# “A package you can grow with”

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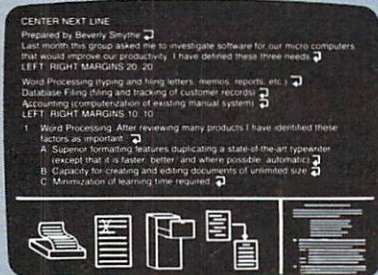


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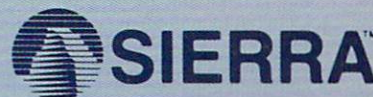
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```

5000 CLS:ALT=V*1000
5010 X=LM+4:Y=10:GOSUB 6500:PRINT "ELEVATION:";ALT
5020 X=LM:Y=19:GOSUB 6500:PRINT "EMPTY"
5030 X=LM+20:GOSUB 6500:PRINT "FULL"
5040 X=LM+1:Y=20:GOSUB 6500:PRINT FL$
5050 Y=21:GOSUB 6500:PRINT BK$:LEFT$(FL$,ME(C))
5060 X=LM+22:GOSUB 6500:PRINT BK$
5070 X=LM+1:Y=22:GOSUB 6500:PRINT FL$
5080 FOR D=0 TO DL*3 STEP SGN(DR):NEXT D
5090 FOR Z=1 TO 5:ME(C)=ME(C)-1
5100 FOR D=0 TO DL/2 STEP SGN(DR):NEXT D
5110 X=LM+2+ME(C):Y=21:GOSUB 6500:PRINT SP$;
5120 R=110+RND*50:IF DIR>0 THEN R=R+100
5130 FOR S=R TO R+49:ALT=ALT+DR
5140 SOUND S,RND*3+1:FOR D=1 TO 20:NEXT D
5150 X=LM+14:Y=10:GOSUB 6500:PRINT ALT;SP$;
5160 NEXT S:SOUND 37,0
5170 NEXT Z:FOR D=1 TO DL*4:NEXT D:RETURN
6000 X=1:Y=22:GOSUB 6500
6010 MS="PRESS ANY KEY TO CONTINUE.":GOSUB 2010
6020 IF INKEY$="" THEN 6020 ELSE RETURN
6500 LOCATE Y,X:RETURN
7000 DATA FREDLU,DERFUL,RULFED,MOON,STARS,NIGHT
7010 DATA D,M,L,BY2,B2Y,2BY,MINUS10,AND10,PLUS10
7020 DATA CENTS,SCENTS,SENSE
8000 DATA SPHGZ,HBC,KECPP,SYHKW,CIBIH,JCSMUC

```

## MODIFICATIONS FOR OTHER COMPUTERS

### Adam/Uphill Drive

Use the Apple version, with the following alterations: Delete lines 6030, 9010, and 9020. Change lines 60, 170, 5100-5120, 6010, 6020, and 9000 to read as follows:

```

60 ce = 10:dl = 250:lm = 3:sw = 31
170 FOR x = b TO b+5:READ a:POKE x,a:NEXT x:POKE b+6,1
59:CALL 28000
5100 r = INT(RND(1)*30)+100
5110 FOR s = r TO r-19 STEP -1
5120 POKE b+6,134:CALL 28000:POKE b+6,s:CALL 28000
6010 GOSUB 2010:POKE 16953,0:GET k$
6020 POKE 16953,95:RETURN
9000 DATA 58,102,109,211,255,201

```

Finally, add lines 10, 5130, 5150, and 5160:

```

10 LOMEM: 29000:b = 28000
5130 POKE b+6,144:CALL 28000
5150 FOR d = 1 TO 50+(dr > 0)*30:NEXT d
5160 POKE b+6,159:CALL 28000

```

### IBM PC & compatibles (40-column version)/Uphill Drive

This program has been tested and found to work on the following computers and hardware configurations, using the BASICs shown: IBM PC w/Color/Graphics Monitor Adapter, w/Disk BASIC D2.00 or Advanced BASIC A2.00. IBM PCjr w/Cartridge BASIC J1.00. Tandy 1000 w/GW-BASIC version 00.05.00 or 01.01.00.

Use the IBM PC 80-column version, except change line 60 to read as follows:

```

60 CE=4:DL=150:LM=8:SW=40:BK$=CHR$(219):WIDTH SW:LOCAT
E,,0

```

### Macintosh w/Microsoft BASIC 2.0/Uphill Drive

Use the IBM PC 80-column version, except change lines 10, 60, 5110, 5120, 5140, and 5160 to read as follows:

```

10 CALL TEXTFONT(4):CALL TEXTSIZE(9):CALL TEXTFACE(1)
60 CE=4:DL=250:LM=25:SW=74:BK$=CHR$(165)
5110 X=27+ME(C):Y=21:GOSUB 6500:PRINT SP$:X=47:GOSUB 6
500:PRINT BK$
5120 R=50+RND*50:IF DR<0 THEN R=R+60
5140 SOUND S,1:FOR D=1 TO 10+DR*2:NEXT D
5160 NEXT S

```

### Tandy Color Computer/Uphill Drive

Use the IBM PC 80-column version, except change lines 10, 60, 80, 5120, 5140, 5160, and 6500 to read as follows:

```

10 CLEAR 2000
60 CE=4:DL=50:LM=5:SW=32:BK$=CHR$(128)
80 FL$=BK$:FOR X=2 TO 22:FL$=FL$+BK$:NEXT X
5120 R=RND(50)
5140 SOUND S,1.5
5160 NEXT S
6500 PRINT$(Y-8)*32+X-1,"";:RETURN

```

### Tandy Models III & 4 (Model III mode)/Uphill Drive

Use the IBM PC 80-column version, with the following alterations: Delete line 5140. Also, change lines 10, 60, 550, 5120, 5160, and 6500 to read as follows:

```

10 CLEAR 2000:PRINT CHR$(15)
60 CE=4:DL=30:LM=20:SW=64:BK$=CHR$(191)
550 PRINT CHR$(14):END
5120 R=10
5160 NEXT S
6500 PRINT$(Y-8)*SW+X-1,"";:RETURN

```

## PROGRAMMING P.S.

Corrections to previous months' programs

**Christmas Tree Construction Set** (December 1985, page 66)

### IBM PC & compatibles w/joystick & disk drive:

This version was labeled in error. It will not run correctly on the IBM PC. However, it will run correctly on the IBM PCjr w/Cartridge BASIC, and the Tandy 1000 w/GW-BASIC 2.02 version 01.01.00. Tandy 1000 owners who have version 00.05.00 of GW-BASIC may return their disks to any Radio Shack store or computer center for a free upgrade.

In addition, sharp-eyed readers may have noticed that lines 4040-4110 were inadvertently duplicated in this listing. It's unnecessary to type in these lines twice.

**Home Information Manager** (August 1985, November 1985, January 1986)

As the introduction to the program states, when designing a card format you may specify a maximum of nine lines; if you try to create a format with more than nine lines, an error message is displayed and the program ceases to function. The following change will allow you to go back and try again if you make that mistake.

**Apple II series w/48K RAM, disk drive (printer optional), & DOS 3.3** (November 1985, page 70):

Change line 310 to read as follows:

```
310 GOSUB 2100:GOTO 540
```

**Commodore 64 w/disk drive or Datasette**

**(printer optional)** (August 1985, page 61): Change line 330 to read as follows:

```
330 GOSUB 2100:GOTO 560
```

**IBM PC/PCjr w/128K RAM & disk drive (printer optional)** (January 1986, page 70): Change line 290 to read as follows:

```
290 GOSUB 2200:GOTO 520
```



## This Month!!

GAME STRATEGY, page 66  
MICROTONES, page 68

Check Out  
Explosion Machine  
Program Page 68

Edited by Anne Krueger

# K-POWER<sup>®</sup>

## FOR THE COMPUTER GENERATION



J.D.K.

Jeff Mitchell, left,  
and Cayce Happel.

## Hail to Hacker Heroes!

**Cayce Happel** is a computing whiz with a heart. A ninth grader from Elizabethtown, Kentucky, Cayce doesn't just use his computing know-how to wow his friends and family. While in eighth grade, Cayce began contributing an hour of his time each school day to use his skills to teach and motivate kids in a special-education class in Rineyville, Kentucky. Cayce created spelling programs and educational games for the class and used computer time as a reward for students trying to increase the skills they had.

Pam Shearer, an administrator of the special-education program and who nominated Cayce, says, "The students eagerly looked forward to the time they spent each day with Cayce." She adds, "I applaud his interest in computers and the valuable way he has chosen to use that energy." K-POWER salutes Cayce Happel.

**Jeff Mitchell** is the hacker hero of Pocatello, Idaho. A seventh grader at Irving Junior High School, 13-year-old Jeff has demonstrated how computers work for the local PTA and has tutored other students in computer skills. He also produces word-hunt programs and questionnaires for classmates so they can bone up on difficult subjects. The activity he's most famous for is sign-making. With his Commodore 64 computer and C. Itoh printer, Jeff has made birthday, welcome, get well, and congratulatory banners for the school. Last year for a sixth-grade social studies project, he created banners for each student to display with his or her project on a different country. "He's earning quite a reputation," reports Donna Mitchell, this hacker hero's mom! K-POWER salutes Jeff Mitchell.

When you think of heroes, you may think of Superman, Geraldine Ferraro, Rambo, or Steven Spielberg . . . but what about the kid with a computer next door? We asked our readers last May to let us know about computer users who're giving hacking a good name. These two heroes each received a \$25 prize:

## Software Scoop!


Yo, fearless fliers, have you tried **AcroJet—The Advanced Flight Simulator** from **MicroProse**? If you've aced **Solo Flight**, this is for you! Red Baron-types can participate in a Decathlon of Sport Aviation in which players vie for the title of "World's Greatest Sport Pilot" (WGSP, of course). To win the event, you'll have to accomplish such high-performance maneuvers as spot landings, ribbon cuts, acrobatics, rolls, loops, and other tricky stuff. Sound good? You can get it for your Apple, Atari, Commodore 64, or IBM for \$34.95.

. . . On sale now from **Electronic Arts**: two new titles. First, there's **Carriers at War**, a World War II historical-simulation game, and second, **Reach for the Stars**, a sci-fi strategy game. **Carriers at War** lets as many as six players assume the roles of top U.S. and Japanese commanders from 1941 to 1945. Players can also design their own ships and aircraft. It's \$50 for Apple and Commodore computers. **Reach for the Stars** is a strategic race played against a backdrop of interstellar exploration, development, and warfare. Four players at once can tackle this intellectual challenge, available for \$45 for Commodore and Apple computers. Both games are by designers

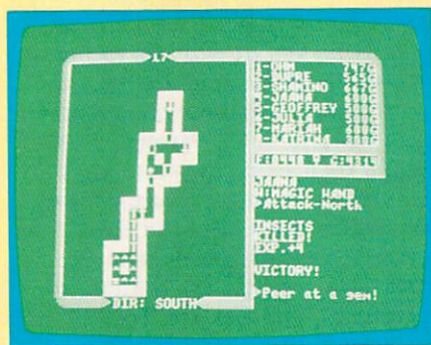
**Roger Keating** and **Ian Trout** . . . Space adventurers might also try **Planetary Construction Set** from **Sunburst**. For Apple only, this game forces you to organize, analyze, and apply scientific data in order to build a planet for your favorite alien. You might even learn something from this one! You can buy it for \$59. . . IBM owners who're in the mood can check out **Football** from **Generic Computer Products, Inc.** This fast-action, one- or two-player game lets you run, pass, and punt, and gives you the feeling you're really out there on the field. It's \$24.95 for IBM PC/PCjr and compatibles. . . That's the score for this month; tune in next issue for more!



## T I P S, T R I C K S, A N D H I N T S

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Virtue	Mantra	Rune Location	Shrine Location	Vision Granted	Stone Color	Principles
Honesty					Blue	
Compassion			East of Britain across two bridges			
Valor	RA					
Justice		Prisoner's cell in Yew				Love Truth
Sacrifice					Orange	
Honor						
Spirituality			Enter Minoc moongate during two full moons			
Humility						



Here is a guide to the eight virtues that can earn you points. *Honesty*: the truth, the whole truth, and nothing but the truth. *Compassion*: If a nonevil creature is fleeing, don't kill it while its back is turned. It also doesn't hurt to give to those less fortunate than you. *Valor*: Kill evil, and kill more evil. Don't flee from it. *Justice*: The blind woman at the herb shop won't be able to tell if you shortchanged her. But you wouldn't do something mean and nasty like that, would you? Again, don't kill those poor, innocent, fleeing creatures. (You don't need the experience that badly.) *Sacrifice*: Give your blood until you're blue in the face. Give every last gold piece to any beggar you see. Be warned: It isn't hard to become a "self-serving tuft-hunter." *Honor*: Solve quests, find things, and live to tell about it. *Spirituality*: Take every opportunity to meditate at shrines (any shrine), even if you're not yet ready for "Avatarhood." *Humility*: Don't claim to be what you're not. As much as you



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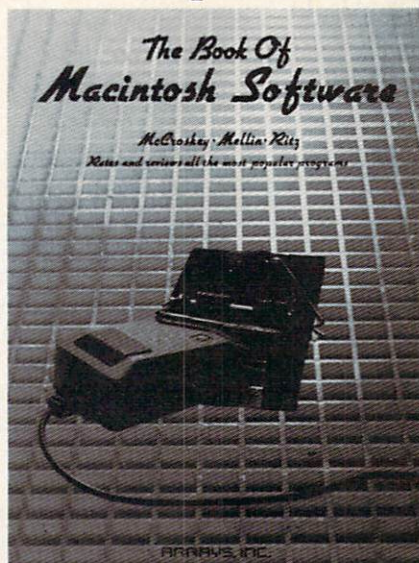
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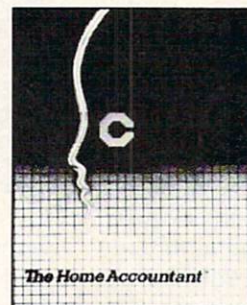


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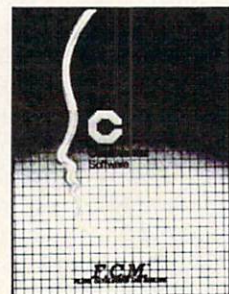


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## TI-99/4A/EXPLOSION MACHINE

```

10 CALL CLEAR
20 PRINT "PLEASE PRESS ANY KEY."
30 CALL KEY(3,K,S)
40 IF S=0 THEN 30
50 GOSUB 1000
60 GOTO 30
1000 CALL SOUND(800,-5-RND*2,0)
1010 FOR D=1 TO 200
1020 NEXT D
1030 FOR I=0 TO 30 STEP 2
1040 CALL SOUND(-1,-5-RND*2,I)
1050 NEXT I
1060 RETURN

```



## VIC-20/EXPLOSION MACHINE

```

10 PRINT CHR$(147);
20 PRINT "PLEASE PRESS ANY KEY.";
30 GET KS:IF KS="" THEN 30
40 GOSUB 1000:GOTO 30
1000 V=15:POKE 36878,V
1010 FOR D=1 TO 100
1020 POKE 36877,INT(RND(1)*65)+130
1030 IF D>25 THEN V=V-0.2:POKE 36878,V
1040 NEXT D:POKE 36878,0
1050 RETURN

```

# M I C R O N O T E S

If you're interested in computers and music, we may have just the summer camp for you! "Summer camp," you're thinking, "Isn't it a little *early* to be thinking about next summer?" Not when you realize that more than 1,300 students from 47 states and 34 foreign countries attended this camp—the Interlochen **National Music Camp**—last summer. When a place is this popular, it pays to get in line early.

Why is Interlochen a good idea for computer-music aficionados? Interlochen Center for the Arts (in Interlochen, Michigan) has an international reputation for being a wonderful camp for musicians and artists. Mary Frances James, director of admissions, said that when she discovered computers greatly interested campers, "the camp decided to make it possible for artists and musicians to combine their studies here with computer training."

That's why **Peter Emerson**, 10, of Miami, Florida, decided to attend Interlochen last summer. Although he plays the piano and sings, Peter's first love is computers. At the camp, Peter learned to program music and compose using computers equipped with speakers and keyboard synthesizers, which can simulate up to 100 different instruments.

"Students here can write music using the same kind of program they'd use for a math equation," said Scott Lis, a computer instructor. Lis has his campers perform mini-recitals of the music programs they've written, and teaches them how to build a data base using composers and other musicians as the data. If this camp sounds interesting, write Interlochen Center for the Arts, Interlochen, MI 49643, for more information. Or call (616) 276-9221.

Here's a low-cost interface, **MIDI Magic**, for Apple IIc and C 64 owners. It costs \$50, plugs directly into the user port, and comes with a six-song demo disk. Micro W Distributing, 1342 B Rt. 23, Butler, N.J. 07405; (201) 838-9027.

Want to stay up-to-date on the rock scene? Take a look at **CompuServe** (\$39.95 to sign up, plus hourly connect charges). The popular on-line service now offers a data base and forum called **RockNet** (type GO ROK). It contains



**Music lover Peter Emerson composes using a computer and music keyboard at the Interlochen Center for the Arts.**

rock music news flashes, reviews of albums and concerts, a radio report, Music Television updates, and profiles of and interviews with rock stars. There's lots more, according to sysop Les Tracy, who's spent more than 20 years in the radio and record industry.

But wait! That's not all CompuServe has for music buffs. In Home Services you'll find THE MUSIC FORUM, general info about music, as well as sales of sheet music and instruments. ORCH-90 offers support and data files for people who have the ORCHESTRA-90 synthesizer. In the Personal Computing area, you'll find the following SIGS: THE COLOR SIG for CoCo owners (offering music data files and public-domain software to play them with); MODEL 100 (programs and music data files for the TRS-80 portable); ATARI (programs for creating music and graphics on Atari computers); COMPUTER ART (with public-domain sound generation programs and music data files); THE CREATIVE CORNER, public-domain software to drive the C 64's synthesizer chip; and IBM NOVICE FORUM, graphics and games with sound effects.

—LINDA WILLIAMS



# WHAT IS THIS GIRL DOING?

THE GIRL IS-  
 TH AX PAS GG3 ER2 LL PAS IH SS  
 29 15 04 34 52 45 04 12 55  
 FEEDING  
 PAS FF IY PA3 002 IH NG PAS BB1  
 04 40 19 02 33 12 44 04 28  
 BREAD TO-  
 RR1 EH EH PA1 001 PAS TT2 UW2  
 14 07 07 00 21 04 13 31  
 A DUCK  
 PAS EY PAS 002 AA KK2 PAS  
 04 20 04 33 24 41 04

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# WHAT'S IN STORE

## NEW HARDWARE/MARKET UPDATE

### SPECIAL SECTION ON MUSIC AND SPEECH SYSTEMS • GROLIER ENCYCLOPEDIA ON COMPACT DISK

#### SYNTHESIZERS

**Orchestra-90** (Tandy Color Computer)

MANUFACTURER: Tandy Corp., 1800 One Tandy Center, Ft. Worth, TX 76102; (817) 338-2335  
PRICE: \$80

The Tandy Color Computer is not thought of as a music-making machine, but with Orchestra-90 (a hardware/software duo), even a 16K CoCo can produce five separate instrument sounds covering a wide six-octave range. The Orchestra-90 cartridge slips into the cartridge slot on the CoCo, and built-in jacks let you connect the computer to a stereo system to create a stereo synthesizer.

Communications software is built into the cartridge. With a modem you can download many existing Tandy Model I, III, or 4 Orchestra-90 files from CompuServe and play them. No disk drive or cassette player is required to use Orchestra-90, but without one or the other you will not be able to save music compositions you've written or downloaded. Instructions on programming music are included with Orchestra-90.

**Votalker** (Apple II, C 64/128, IBM)  
MANUFACTURER: Votrax Inc., 1394 Rankin, Troy, MI 48083-4074; (800) 521-1350

PRICE: \$249 (IBM PC); \$179 (Apple II/Ile/II plus); \$100 (C 64/128)

Votrax, a respected maker of products that translate computer data and text into speech, says its Votalker brings "a new level of clarity and versatility of phonetic voice" to personal computers. Votalker, which can be used as an educational tool for young children learning to read and spell or as a talking "proofreader" for the visually impaired, is available for the Apple II series (except IIc), IBM PC, and Commodore 64/128.

The Votalker C 64 (for the C 64 and C 128) plugs into the expansion port. With the SPEAK command, you can type words, numbers, and other symbols on the computer and hear them spoken. You control the pitch, volume, and speed to create natural-sounding (or bizarre) voices. *Trivia*



*Talker II*, a talking question-and-answer game (on disk), costs \$35.

Both the Votalker AP (Apple) and Votalker IB (IBM) are internal plug-in boards that require no serial cards or cables, as external speech synthesizers do. An on-board speaker is included, as are a software "translator" (on disk) and a comprehensive user's manual. With the software translator, Apple and IBM Votalkers have an unlimited vocabulary and 32 inflections, and can "sing" in five octaves.

**Voice Master** (Apple II series, Atari 800/800XL/130XE, C 64/128)

MANUFACTURER: Covox Inc., 675 Conger St., Eugene, OR 97402; (503) 342-1271  
PRICE: \$90



Voice Master, which comes with software and a headset microphone, plugs into the joystick port on the IIc. Through the microphone, you can record and store speech or music on disk; then Voice Master will play it back. You can also incorporate these sounds into BASIC programs.

The Apple IIc and Atari 800, 800XL, and 130XE versions of Voice Master were recently released. Voice Master is already available for the Commodore 64/128 and Apple II/Ile/II plus.


Voice Master also has voice-recognition capability. Groups of 32 spoken words may be saved to disk;

when they are spoken back to the computer, Voice Master will recognize them. This feature can be used to good effect in a BASIC educational program. A demonstration audio cassette is available directly from the company.

#### MARKET UPDATE

**Grolier, Inc.**, publisher of Encyclopedia Americana and the Academic American Encyclopedia, has put the latter reference work on a compact disk. This set of 21 volumes and 9 million words takes up about 50,000K, while the index takes up 60,000K! This refined and enhanced version of Grolier's on-line encyclopedia (available on CompuServe and BRS After Dark, among others) costs \$199. Annual updates will be available, probably for about \$49.

There are two main advantages in using a computer to explore the encyclopedia's huge data base: 1. You can do more complicated searches for words, groups of words, or concepts because the electronic index dwarfs the print version and does cross-correlations; and 2. You search much faster (three to five seconds maximum) than it would take thumbing through a handful of books. The electronic encyclopedia also has information about contemporary figures, such as Doug Flutie, that the print version ignores, and it's easier to bring up-to-date.

The brand-new software format is called CD ROM—a "read-only" compact disk that the user cannot write to or change. To use the Grolier encyclopedia, you need a CD ROM drive (to hold the encyclopedia disk), an interface for your computer, and search software on a floppy disk. Created by Activenture Corp., search software is now available for the IBM PC (with 256K) and Atari 520ST computers. Sony, Hitachi, and N.V. Philips have developed CD ROM drives, but DEC is the only manufacturer selling them directly to consumers, according to Grolier. They cost around \$2,000. The Grolier disk will run on any CD ROM player, but, unfortunately, it won't work on an audio compact disk player. Grolier Electronic Publishing, 95 Madison Ave., New York, NY 10016; (212) 696-9750. 



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| 11/83 Buyer's Guide to Printers                              | 5/84 A Hands-on Review of Apple's Macintosh  | 1/85 Putting Your Finances in Order First Time — K-POWER: The Magazine for Kids! |
| 12/83 The Layman's Guide to Word Processing                  | 6/84 Earning Money Using Your Computer   | 2/85 Guide to Computer Care and Maintenance                                      |
| 1/84 A Hands-on Review of Coleco's Adam                      | 7/84 Buyer's Guide to Portable Computers   | 3/85 Telecomputing: The Great Computer-Phone Link                                |
| 2/84 A Novice's Guide to Programming Languages               | 8/84 Special: Beginner Programs for Adam, Apple, Atari, Commodore, IBM, TI, Timex, TRS-80 and VIC-20 |  |
|  | 9/84 SAT Software<br>Buyer's Guide to Disk Drives  |  |
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# WHAT'S IN STORE SOFTWARE GUIDE

## QUICK TAKES ON SOFTWARE— NEW AND NOTEWORTHY

Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews follow the chart. Unless otherwise noted, all programs are in disk format. Minimum memory requirements are 48K for Apple II series, 48K for Atari, 128K for IBM PC/PCjr or compatibles, and 128K for Macintosh.

Here's a rundown of the rating categories and what

they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system, in the games reviews, the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

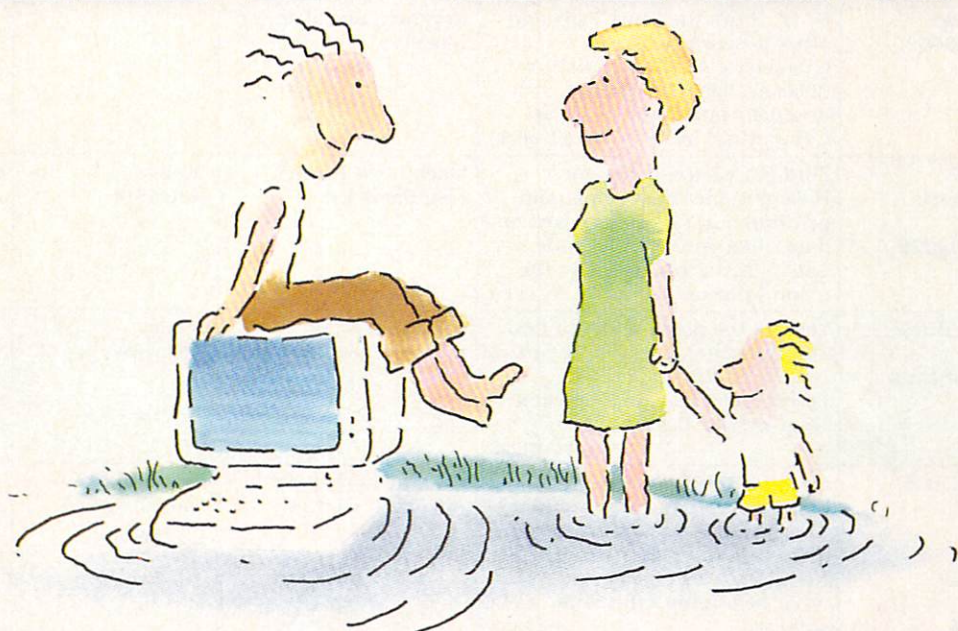
### HOME BUSINESS & PRODUCTIVITY

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings					
				O	D	EH	GQ	EU	V
BEAGLE GRAPHICS Beagle Bros. Inc. 3990 Old Town Ave. San Diego, CA 92110 (619) 296-6400 \$60 ©1984	Versatile drawing program to help with your graphic creations. Paint with a palette of over 250 colors. Finished work can be displayed on-screen in a "slide show." —ZORBERG	128K Apple IIe/IIc. Joystick, mouse, or graphics tablet optional.	Unlimited warranty; \$5 for replacement if user-damaged. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★
FONTRIX Data Transforms 616 Washington St. Denver, CO 80203 (303) 832-1501 \$95 (Apple); \$155 (IBM) ©1984	A next step up from <i>The Print Shop</i> , with much more extensive capabilities. Design signs, newsletters, and more. Choose from dozens of fonts (some sold separately), or create your own.† —WILSON	Reviewed on Apple. Also for 256K IBM PC/PCjr with color graphics adapter. Printer required. Joystick, mouse, or graphics tablet optional.	Unlimited warranty. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	D	★ ★ ★ ★
HANDIC DATA BASE Handic Software, Inc. 400 Paterson Plank Road Carlstadt, NJ 07072 (201) 933-1455 \$60 ©1985	Flexible sorting procedures characterize this reasonably good filing program that also allows you to do a lot with one basic file. Manual designed for the absolute novice. —ODISIO	C 64/128 (disk and cart.).	60-day warranty (includes user-damaged). \$35 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★
MOUSEWRITE Roger Wagner Publishing, Inc. 10761 Woodside Ave. Santee, CA 92071 (619) 562-3670 \$125 ©1985	The mouse-related functions work better than the word processor itself in this Mac-like program. Some nice features, such as automatic word count, but I had difficulties with printing.† —MORGENSTERN	Reviewed on Apple IIc. Also for 128K enhanced Apple IIe. Mouse optional.	30-day warranty (includes user-damaged). User makes backup.	★ ★	★ ★	★ ★	N/A	E	★ ★
PHILIP ALLEN'S TOTAL FITNESS FOR LIFE Wm. C. Brown Publishers 2460 Kerper Blvd. Dubuque, IA 52001 (319) 588-1451 \$20 ©1985	Design fitness routines for strength, flexibility, weight control, endurance, and relaxation. It's a solid package, but the manual offers more than the software. —CONDOR	Reviewed on Apple. Also for IBM PC.	30-day warranty (includes user-damaged).	★ ★ ★	★ ★ ★	★ ★ ★	N/A	E	★ ★ ★
WEBSTER'S NEW WORLD SPELLING CHECKER Simon & Schuster, Inc. 1230 Ave. of the Americas New York, NY 10020 \$50 (Apple); \$60 (IBM) ©1985	A real boon for anyone who writes on a computer. Inspects your word-processor documents for misspellings and typos. Shows errors within context. You can add words to the 114,000-word dictionary.† —RASKIN	Reviewed on IBM PC compatible (Columbia). Also for Apple; IBM PC/XT/PCjr.	30-day warranty. \$5 thereafter up to one year. User makes backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	N/A	E	★ ★ ★ ★

**RATINGS KEY** **O** Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart



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**-Brad Baldwin, InfoWorld Magazine**

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# WHAT'S IN STORE SOFTWARE GUIDE

## EDUCATION/FUN LEARNING

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	EH	GQ	EU	V	
COLOR ME Mindscape, Inc. 3444 Dundee Road Northbrook, IL 60062 (312) 480-7667 \$30 ©1985	Paint on-screen or print out with this art processor for kids ages 6-12. Stars the Shirt Tails and other licensed cartoon characters. Additional picture disks available (program originally published by Versa Computing, Inc.). —SUMMERS	Reviewed on C 64/128. Also for Apple. Joystick, KoalaPad, or mouse.	90-day warranty.	★	★	★	★	A	★	★
COMET HALLEY Great Wave Software 104 Gilbert Ave. Menlo Park, CA 94025 (415) 325-2202 \$30 ©1985	Find out where to look for Halley's comet by viewing (and printing out) sky maps based on date, time, and your latitude. Lots of extra info, too, like the moon's phases. —AKER	Macintosh. Printer recommended.	90-day warranty.	★	★	★	★	E	★	★
THE DOLPHIN'S RUNE Mindscape, Inc. (See above for address and phone) \$30 ©1985	You are the dolphin as you find and translate hieroglyphic verses hidden on the ocean floor. Perceptual skills are more vital than joystick dexterity.† —SUMMERS	C 64/128. Color monitor, joystick.	90-day warranty.	★	★	★	★	A	★	★
LEARNING TO ADD & SUBTRACT Panda/Learning Technologies, Inc. 4255 LBJ Freeway, Suite 131 Dallas, TX 75244 (214) 991-4958 \$20 ©1985	Math for youngsters here—single digit addition and subtraction. The graphics make the problems more fun, but do not illuminate. No more or less imaginative than other beginning arithmetic software. —FRANK	Reviewed on Apple. Also for C 64/128.	Unlimited warranty. \$10 for backup.	★	★	★	★	E	★	★
MICROZINE #9 Scholastic Software 730 Broadway New York, NY 10003 (212) 505-3501 \$40 ©1985	A magazine-like disk containing an adventure game, budgeting software, and a build-your-own quiz program. An attractive purchase for ages 8-13. —MORGENSTERN	Apple.	60-day warranty. \$10 thereafter up to one year.	★	★	★	★	E	★	★
SHOW DIRECTOR Mindscape, Inc. (See above for address and phone) \$30 ©1985	By creatively using art, animation, and sound, makes writing so much fun that children forget to hate it. The finished product is an animated movie. For ages 8+.† —SUMMERS	Reviewed on C 64/128. Also for IBM PC/PCjr. Joystick optional.	90-day warranty.	★	★	★	★	A	★	★
SPELLER BEE First Byte, Inc. 2845 Temple Ave. Long Beach, CA 90806 (213) 595-7006 \$80 ©1985	Teaches spelling using fun voice synthesis; the computer speaks each word from the lists you make up. Three word games provide the lessons. Best for grades 1-6. —RASKIN	Macintosh. Planned for Amiga; 128K Apple IIe/IIc.	90-day warranty (includes user-damaged). \$15 thereafter.	★	★	★	★	E	★	★
THE WRITING ADVENTURE DLM Software One DLM Park Allen, TX 75002 (214) 248-6300 \$60 ©1985	Unlike adventure games, your ultimate task here is to write about your adventure. Stimulates creativity, but the manual is confusing and the program somewhat laborious. For ages 12+. —MORRIS	Apple. Color monitor recommended.	6-month warranty. \$15 thereafter or for backup.	★	★	★	★	D	★	★

**RATINGS KEY** O Overall performance; D Documentation; EH Error-handling; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart



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**GAMES** REVIEWS BY JAMES DELSON

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings						
				O	D	PS	GQ	EU	V	
BERSERKER RAIDS Baen Software 260 5th Ave. New York, NY 10001 (212) 532-4111 \$35 ©1984	An exciting game of galactic expansion and colonization. Features include spaceship construction set, complex combat scenarios, and more. A good intro to space games for ages 12+.	Reviewed on Apple. Also for Atari; C 64; IBM PC.	30-day warranty. \$5 thereafter for up to one year.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
DECISION IN THE DESERT MicroProse Software 120 Lakefront Drive Hunt Valley, MD 21030 (301) 667-1151 \$40 ©1985	This fast-paced strategy and tactics game puts you into the North African campaign in World War II. Features five battle scenarios. Fun for gamers of all experience levels; ages 12+.	Reviewed on 64K Apple. Also for Atari; C 64/128 IBM PC/PCjr. Joystick optional.	90-day warranty. \$10 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★	
FORCE 400 Baen Software (See above for address and phone) \$35 ©1984	Combines elements of chess, checkers, and Stratego in an excellent abstract strategy game. An original design and a must for gamers ages 10+.	Reviewed on IBM PC. Also for Tandy Models I/III.	30-day warranty. \$5 thereafter for up to one year.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	E	★ ★ ★ ★	
THE HOBBIT Addison-Wesley Publishing Co. 1 Jacob Way Reading, MA 01867 (617) 944-3700 \$30-\$35 ©1985	A sophisticated adaptation of J.R.R. Tolkien's classic novel (a copy is enclosed). Playtesters who had read the book enjoyed this text/graphic adventure more. Sometimes hard to follow. For ages 12+.	Reviewed on 64K Apple. Also for C64/128; IBM PC/PCjr.	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★	
IMPOSSIBLE MISSION Epyx 1043 Kiel Court Sunnyvale, CA 94089 (408) 745-0700 \$39 ©1985	Enter the underground headquarters of an evil genius and foil his plot to (dare I say it?) rule the world! A thrilling arcade/role-playing game that will entertain kids ages 8+.	Apple. Joystick.	90-day warranty. \$5 thereafter.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
KARATE CHAMP Data East 470 Needles Drive San Jose, CA 95112 (408) 286-7074 \$34 ©1985	Try this first-rate adaptation of the popular coin-op arcade game. 1-2 players activate kicks, somersaults, and more. Excellent animation enhances this game for ages 8+.	Reviewed on Apple. Also for C 64/128. Joystick(s) required for C 64/128.	90-day warranty.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
KING'S QUEST II Sierra On-Line, Inc. P.O. Box 485 Coarsegold, CA 93614 (209) 683-6858 \$50 ©1985	Real-time action with more thrills and puzzles makes this adventure a top follow-up to last year's hit. Your character walks, runs, swims, and climbs. Suitable for ages 12+.	Reviewed on IBM PC. Also for 128K Apple IIe/IIc; Atari 520ST; IBM PCjr; Macintosh. Joystick optional.	90-day warranty (includes user damaged). \$5 thereafter.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	D	★ ★ ★ ★	
NORTH ATLANTIC '86 Strategic Simulations 883 Stierlin Road, Bldg. A-200 Mountain View, CA 94043 (415) 964-1353 \$60 ©1983	The hopefully hypothetical scenario? A land, sea, and air confrontation between NATO and Soviet forces. An unusual play system makes this fun for 1-2 serious gamers ages 12+.	Reviewed on Apple. Planned for C 64.	30-day warranty. \$10 thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	A	★ ★ ★	
RICHARD PETTY'S TALLADEGA Cosmi 415 N. Figueroa St. Wilmington, CA 90744 (213) 835-9687 \$20 ©1984	Difficult but exciting solo car-racing game. Using real driving skills, you race against a flock of computer-controlled cars on a variety of tracks. Suitable for ages 8+.	Reviewed on C64/128. Also for Atari. Joystick.	90-day warranty. \$10 thereafter or for backup.	★ ★ ★	★ ★ ★	★ ★ ★	★ ★ ★	D	★ ★ ★	
ULTIMA IV Origin Systems, Distributed by Electronic Arts 2755 Campus Drive San Mateo, CA 94403 (415) 571-7171 \$60 ©1985	Great! Another winning role-playing adventure from this phenomenally popular series. Includes improved spellcasting, more communication with other creatures, and better graphics. <i>Ultima IV</i> offers hours of superb play. Best for ages 12+.	64K Apple. Also for C 64/128. Mockingboard optional.	90-day warranty. \$7.50 thereafter or for backup.	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	★ ★ ★ ★	A	★ ★ ★ ★	

**RATINGS KEY** O Overall performance; D Documentation; PS Play system; GQ Graphics quality; EU Ease of use; V Value for money; ★ Poor; ★★ Average; ★★★ Good; ★★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart



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# WHAT'S IN STORE

## SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 74 for information such as backup policies and addresses of software publishers.

### HOME BUSINESS & PRODUCTIVITY

#### Fontrix

HARDWARE REQUIREMENTS: Apple; IBM PC/PCjr.

PUBLISHER: Data Transforms, Inc.  
PRICE: \$95 (Apple); \$155 (IBM)

I love the moment when I realize I have found a longtime friend. That's the experience I had within my first hour of exploring *Fontrix*.

The "trick" in *Fontrix* is its ability to scroll from one high-resolution graphic screen to another and to connect them into one printed page. This permits you to design pages that are many screens wide and deep. The page might be a brochure, a newsletter, a sign, or simply a fun and fancy letter.

Eleven fonts, or typefaces, are provided. Ten additional fonts are available in each of the 13 separately sold *Fontpaks* (\$25 each). Fonts range from the classic Roman to the elegant Old English to the highly ornamental Script typeface. But fonts need not be typefaces only; some fonts contain borders, symbols, and little pictures. If all these font options are not enough, *Fontrix* gives you the tools to make your own.

You can insert standard picture files onto your *Fontrix* page before or after adding text. Pictures can be created with other programs or devices, such as *Blazing Paddles* or a *KoalaPad*, as well as with *Fontrix*.

The print-out mode within *Fontrix* is especially impressive. It supports 21 brands and 67 models of printers, including color printers. When printing, you control the size of your image and its position on the page. Furthermore, you can crop any image or rotate it by 90 degrees.

While I rated *Fontrix* as difficult to use, you can employ it for simple tasks (such as creating a headline or personalized stationery) within a short time. For full utility, though, *Fontrix* takes a while to grow into. The manual provides an effective reference for your learning growth.

Because the IBM version requires greater memory, it contains more features than the Apple version. Fea-

tures of the IBM version include the ability to input text with your word processor, too (rather than inputting just with *Fontrix*, as in the Apple).

*Fontrix* is a useful and capable tool that should delight those folks who like *The Print Shop* or *The Newsroom* but want a more sophisticated page-layout program.

—DAVID WILSON

#### MouseWrite

HARDWARE REQUIREMENTS: 128K enhanced Apple IIe/IIc.

PUBLISHER: Roger Wagner Publishing, Inc.

PRICE: \$125

In looking at *MouseWrite*, I wondered about the merits of the mouse. Is it convenient to take your hands off of the keyboard while writing? To my pleasure, "mousing around" works just fine. But some parts of the package let me down, especially the documentation. The manual is clear about what it tries to explain; what it omits, though, causes problems.

All the basic word-processing functions are accomplished with simple pull-down menus and a few clicks of the mouse. The intuitive feel of point-and-click commands makes the program easy to learn. Helpful features include a time-and-date stamp for your files, an automatic word-counter, and an evaluation of the reading level of your text, based on word and sentence length.

At first, I thought my difficulties were the fault of the word processor itself. Even though I followed the manual's instructions for printing in both narrow and wide type sizes, the margins were thrown off, or the printout broke lines in mid-word.

Then a friend who had worked a lot with *MouseWrite* pointed out a solution for the wide type size that wasn't mentioned in the manual. I still couldn't produce the narrow type size on a full line. Subsequently, I found out that the program wasn't designed to fill a whole line with my printer's narrow type size, even though the manual seemed to indicate otherwise. That was a let-down.

The documentation's sins of omission caused other problems. What it calls an "indentation," I think of as a "margin." And then, when I wanted to indent my text, I needed to use the "margin" command. Confusing? You bet—especially when "indenta-

tion" isn't even mentioned until page 96 of the manual. Poor documentation limits a program, making for inefficiency where it need not be.

*MouseWrite* also doesn't let you format a new data disk without first clearing your document from memory. What happens, then, if you want to save something you've just written, but don't have a formatted data disk with enough space on hand? You can't. That was another let-down. (The publisher promises to fix this problem with a later version.)

Is a mouse-driven word processor a good idea? Maybe, but *MouseWrite*'s flaws made this easy-to-use program frustrating when it shouldn't have been.

—STEVEN MORGENSTERN

#### Webster's New World Spelling Checker

HARDWARE REQUIREMENTS: Apple; IBM PC/XT/PCjr.

PUBLISHER: Simon & Schuster, Inc.  
PRICE: \$50 (Apple); \$60 (IBM)

"If you need help with your spelling and typographical errors," then take a look at *Webster's New World Spelling Checker*. Based on two hardcover dictionaries, this program checks the spelling of your word-processing documents against its extensive, 114,000-word dictionary.

*Webster's* works with files from popular IBM and Apple word processors, including *WordStar*, *PFS:Write* (IBM only), *Apple Writer II*, *Perfect Writer*, *Bank Street Writer*, *VolksWriter*, and *HomeWord*. *Webster's* also allows you to customize it to work with many ASCII-based word processors.

First, the program scans your document and flags your spelling errors and typos, highlighting each word it doesn't recognize within the surrounding nine lines of text. As you view the problem word, alternative spellings are presented in another on-screen window. You can replace the spelling or leave it intact, erase the word, or more. You're given on-screen prompts for all the commands, so there's nothing to memorize.

*Webster's* is nearly untrickable. If the words included don't cover your needs, you can always add words. *Webster's* also detects repeated words, such as "I love you you," and it flags words that are run together, like "theymay." But remember, no spelling checker can find correctly

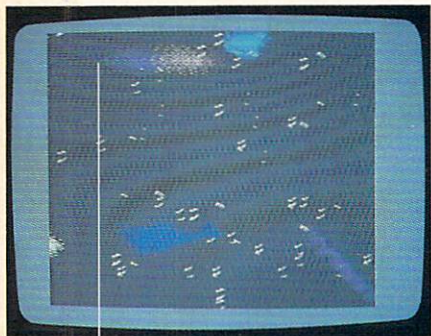


spelled words incorrectly used, to wit: "Twins are too of a kind." If you haven't the foggiest idea about how to spell a word, *Webster's* often can interpret your phonetic attempts. I typed "newmonia," for instance, and the program actually dug up "pneumonia."

There are some limitations. The program doesn't work well with documents longer than 20 pages. But whether you are a ninth-grader with a term paper, a businessperson with vast correspondence, or a Ph.D. with a thesis, *Webster's New World Speller* is one fine cure for misspellings and typos.

—ROBIN RASKIN

## EDUCATION/ FUN LEARNING



### The Dolphin's Rune

HARDWARE REQUIREMENTS: C 64/128;  
PUBLISHER: Mindscape, Inc.  
PRICE: \$30  
PUBLISHER'S SUGGESTED AGES: 12 +

Like relics of a lost civilization, the dolphin's runes lie hidden among the creatures and plants of the ocean floor. Guided by the clicks and beeps of dolphin language and bits of dolphin lore revealed in dreamlike visions, you must find and translate nine runic verses, one at a time. Only then can you solve the mystic riddle they contain. But beware! Sharks and the fishermen's nets frighten and threaten you, for you are the dolphin.

*The Dolphin's Rune* is a multisensory creation that requires skills frequently untapped by traditional teaching methods and games. Although dexterity is needed for joystick control, your perceptions are even more important. You must differentiate among sounds and gradations of color to find the ocean currents that will lead you to the runes. Once you've found them, their hidden hieroglyphics are released only after you've touched the right num-

ber of runes in the right order—a sequence you must discover for yourself. The glyphs then appear at the bottom of the screen. You translate them using the key provided.

If you can translate all ten verses, you may be able to solve the riddle the program poses. But playing the game again might reveal a different ending to the runic poem—and only one of the three versions is the real solution to the riddle.

There are two flaws to be aware of. Many of the glyphs are too similar, making it hard to tell them apart on-screen. Also, while it takes many hours to complete a game, there's no way to save one in progress. Even so, our older children were enchanted with *The Dolphin's Rune* from the moment they opened the package. It has appeal for bright fans of science fiction and fantasy.

—TAN A. SUMMERS

### Show Director

HARDWARE REQUIREMENTS: C 64/128;  
IBM PC/PCjr.  
PUBLISHER: Mindscape, Inc.  
PRICE: \$30  
PUBLISHER'S SUGGESTED AGES: 8 +

When I was in school, English composition was the subject students loved to hate. Things haven't changed much since then; that's why *Show Director* delighted me. By using imaginative art, animation, and sound effects, it makes writing so much fun that kids forget to hate it. The finished product is an animated movie.

A simple word processor helps with the script-writing. Producing the show comes next, as you select one of four locations, ranging from a haunted mansion to an enchanted forest. Then, in casting your show, as many as 40 people, animals, monsters, and, well, *things* can arrive for auditions. You'll have to be selective, though, since only four can appear in each scene within the show. After positioning a character on-screen, you can use either a joystick or the arrow keys to move him/her/it through 30 seconds of action. Since each character is programmed separately, getting their moves to match can be tricky.

Adding background music and clever sound effects (such as a rumbling earthquake) is the most popular part of the show at our house. Again, some guesswork is involved, since you must time the music and sounds to match the action you've

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already put together.

Now, it's time to show off. The script appears on separate screens before each scene plays on-screen. You can save a show and make changes later.

*Show Director* is simple enough for most children ages eight and up to play alone, but guidance from a parent makes it more educational. Left on their own, many children won't bother to write a script. Interested adults can encourage plot development and help youngsters clarify the sequence of action. The documentation includes good suggestions for parents interested in making *Show Director* an educational tool.

—TAN A. SUMMERS

### GAMES



#### Decision in the Desert

HARDWARE REQUIREMENTS: Apple; Atari; C 64/128; IBM PC/PCjr.

PUBLISHER: MicroProse Software

PRICE: \$40

CRITIC'S SUGGESTED AGES: 12+

Here's the first real-time simulation of the North African campaign during World War II. Featuring five different battle scenarios, the game lets players maneuver the troops of four nations: Germany, England, Italy, and the United States. Starring historical figures such as the German General Erwin Rommel (known as "The Desert Fox") and Field Marshal Bernard Montgomery of Great Brit-

ain, *Decision in the Desert* takes you from Tobruk to El Alamein and beyond.

Each battle has solo and multi-player potential with a number of variations. They include adjustable expertise levels, increased troop strength for each side, full or limited spy operations, and other options. In effect, each game can be played over and over without repeating the same setup criteria.

As in most strategy and tactics simulations, careful pregame research is recommended. That way, you'll be able to make better plans, leading to more enjoyable play sessions. *Decision in the Desert* is great for team play and is an ideal introductory simulation for first-timers. An excellent joystick-controlled play system also makes this a worthwhile choice for gamers at all levels of experience.

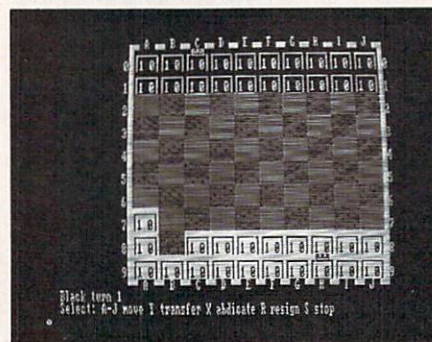
#### Force 400

HARDWARE REQUIREMENTS: IBM PC; Tandy Models I/III.

PUBLISHER: Baen Software

PRICE: \$35

CRITIC'S SUGGESTED AGES: 10+



What a game! I couldn't tear play-testers—or myself—away from this abstract strategy simulation. With an easy play system, it's a cinch to learn. The problem is that it takes forever to master the intricacies of play, much less to understand and use it properly!

Using a simple 10-square by 10-square grid board, each player moves 20 pieces, one of which is designated "king." The object is to take the other's king, as in chess, but the method of play is very different.

Each piece begins with a strength of 10 points. Each turn, you choose from five options: one, transfer points from one of your pieces to another; two, "recharge" a piece by moving it to your or your opponent's

back row, thereby gaining an additional 10 points; three, move one piece across the board from one to 10 squares; four, abdicate your king's title to another of your pieces; or five, engage an opponent's piece in combat.

*Force 400* combines elements of chess, checkers, and Stratego into a hybrid original, and is one of the best games I've played in any medium. A plethora of strategy options and variable ability levels allow both newcomers and advanced players a stimulating challenge. This future classic is a must for all serious gamers.

#### Karate Champ

HARDWARE REQUIREMENTS: Apple; C 64/128.

PUBLISHER: Data East

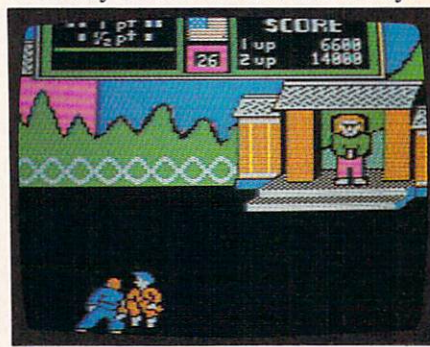
PRICE: \$34

CRITIC'S SUGGESTED AGES: 8+

As the coin-operated arcade-game market struggles along, occasional hits still emerge from the pack. Some remain popular long enough to spawn home computer versions. *Karate Champ* has made the transition with ease. This is a top arcade game for players whose tastes remain firmly grounded in the coin-operated arcade genre.

Played using joysticks or the keyboard, the game can be a solo challenge against a digital opponent or a two-person competition. The action consists of kicks, punches, jumps, spins, somersaults, and more. You're judged on your performance by a computer referee that decides all hits and grades them with full or half points. The player with the higher score after a round of "falls" wins.

Excellent, fully animated graphics enhance this program, but the solo competition creates some problems. That's because the computer executes its own moves more quickly than any human. Thus, one always





seems to be behind the computer. Naturally, playtesters enjoyed the two-player game better. The play system also grows a bit boring after extended use; that could have been prevented if the game allowed character growth. But for arcade aficionados, this is state of the art.

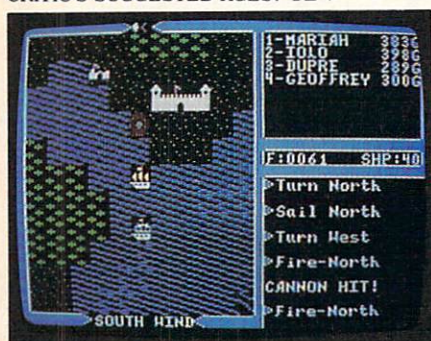
#### Ultima IV

HARDWARE REQUIREMENTS: Apple; C 64/128.

PUBLISHER: Origin Systems, distributed by Electronic Arts.

PRICE: \$60

CRITIC'S SUGGESTED AGES: 12 +



I consider myself a purist when it comes to role-playing games. For purists, there have been four great role-playing series: Wizardry, with three games to date; the duo of Galactic Gladiators and Galactic Adventures; the Temple of Apshai Trilogy, which was preceeded by four Apshai-related titles; and, until now, the Ultima trio.

One-and-a-half years in the making, Ultima IV was well worth the wait. In this sequel you create a new central character through a question-and-answer system designed to define your attitude toward traits such as truth, justice, and honor. Your main character then goes on to explore the world of "Britannia." In your quest of the Avatar, you spend as much time talking with human beings and other creatures as you do fighting with them.

Ultima IV relies on your honor and sense of responsibility, and rewards you for simple acts like courtesy and charity, as well as for your prowess in combat. Along with new spell-casting rules, the graphics are improved, and, as expected, there's a superb play system. The playtesters and I only wished we could generate our own characters besides the central figure. But, even without that feature, this is a winner all the way.

—REVIEWS BY JAMES DELSON

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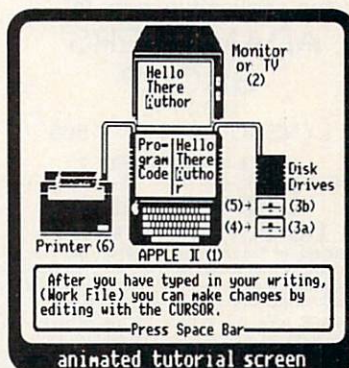
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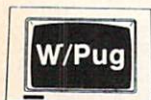
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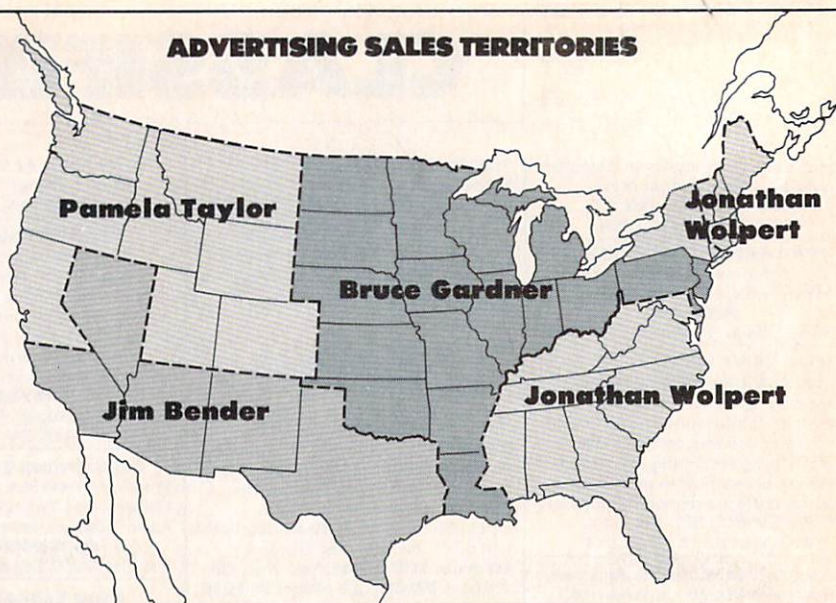
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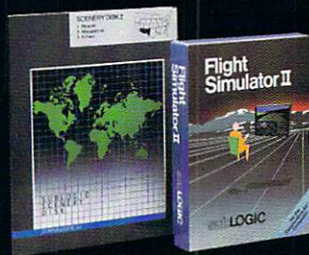
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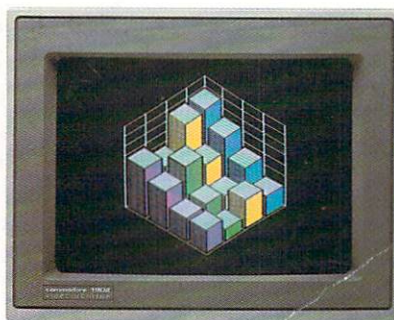


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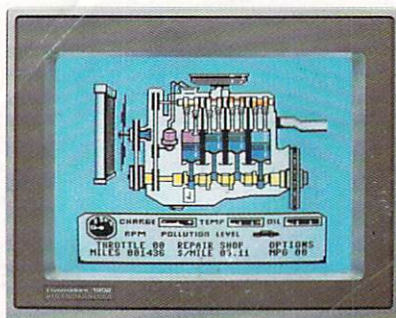
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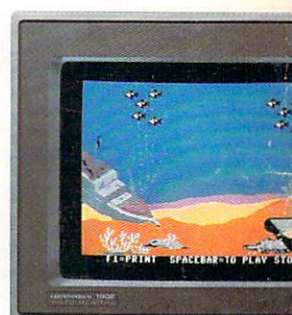
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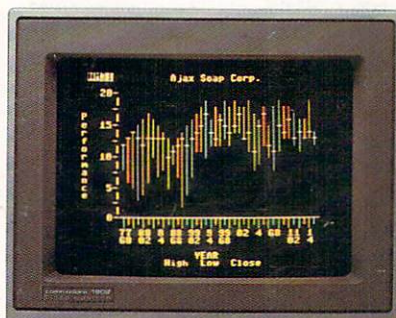
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